IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication NOVEMBER 16, 1961

★ On the Ohio Valley Waterfront:

Changing Ohio R. Shapes Industrial Expansion p. 77

Is Tool and Die Pinch Coming? p. 84

Building-Block Handling System p. 107

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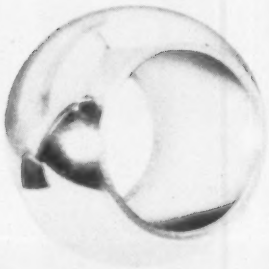
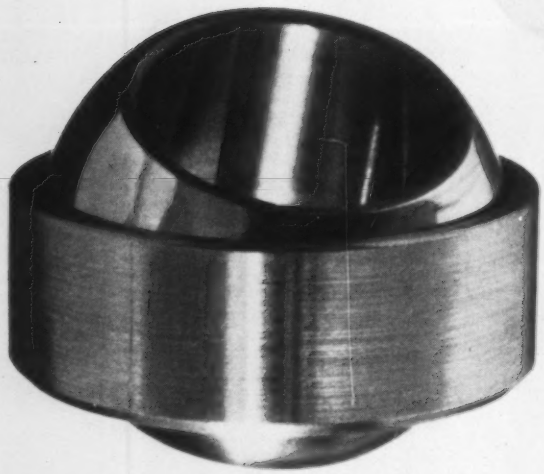
minute particles of lead...





improve surface finish

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Bethlehem special bar section helps capture design award for copper-headed steel conductor rail

This year's top industrial award in the annual Copper and Brass Research Association achievement competition went to this copper-headed steel conductor rail. Manufactured by Ringsdorff Carbon Corporation, East McKeesport, Pa., the rail combines the conductivity of copper with the strength of steel. The result is a compact, low-maintenance product, ideal for use on fixed-track, materials-handling equipment.

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To produce the rail, Ringsdorff draws the two components—the extruded-copper "head" and the hot-rolled Bethlehem carbon steel "T" section—through a die which compresses the copper flanges around the bulbed end of the tee, as well as around the diamond-shaped "ribs" rolled into each side of the steel. These ribs are an essential feature of the hot-rolled bar, as they serve to unify the thermal expansion of the two metals: since the copper head is free to move along the steel tee only between two adjacent ribs, the effect of their different expansion rates cannot become cumulative along the 30-ft length of the rail.

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IRON AGE

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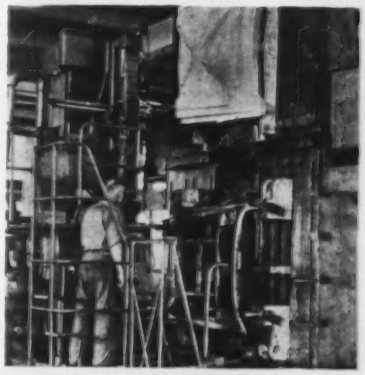
Special This Week

Ohio Valley Gets a Face Lifting

The Ohio River Valley is in the midst of a major overhaul. And industry is reaping the benefits of the change. Big modern dams are replacing the old ones. And suddenly, more metal producers are finding it cheaper to ship to some areas by barge. This week's Special Report examines the major changes. p. 77



Tool and Die Prices Set for Rise

The recent shakeout of tool and die shops has largely halted with the pickup in business. But fewer shops are around to handle the bigger-than-usual batch of winter orders. All this points to higher prices as overtime mounts in the shops. p. 84

Modular Units Automate Handling

Using a building-block approach, you can automate all phases of your materials handling operations. A central control console dictates the scope of any or all of five basic functions: Identification, dispatching, storage, recall and delivery. p. 107

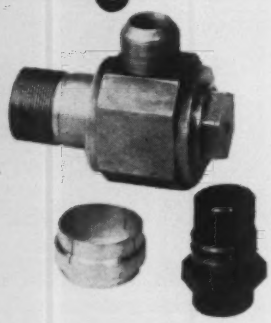
Next Week

Shifts Coming in Defense Buying

Inside the Pentagon, major changes are under way in defense buying policies. Companies engaging in defense business will have to revise their policies and practices, too. Next week's Special Report outlines problems, and sketches possible solutions.

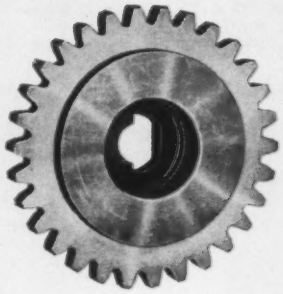
REPORTS ON RYCUT

world's fastest machining alloy steels in their carbon ranges



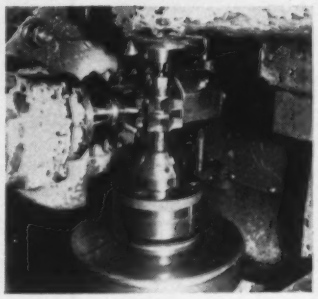
CUTS PRODUCTION COST 50% for Flodar Corp.

This manufacturer of high pressure hydraulic tube and pipe fittings reports production cost savings of 50% after switching from 4150 to Rycut® 50 and from 4140 to Rycut 40. In addition to higher production, Rycut machined to a better finish, held size perfectly and eliminated scrap loss. (With 4140 and 4150 scrap loss ran up to 30%.) And tool life, from 1 to 3 hours with the standard alloys, was boosted to 8 hours with Rycut.



MACHINES 35% FASTER for American Bosch

Rycut 40 was selected by American Bosch for this plunger drive gear for a diesel injection pump because it machines 35% faster than 4140—keeping machining costs at a minimum without sacrifice of mechanical properties. The company also found that Rycut 40 produced a better finish than 4140 and reduced down time by lengthening tool life.



BOOSTS SPROCKET PRODUCTION for McCulloch Corp.

These are the results obtained at McCulloch Corporation when they switched from non-leaded alloy to Rycut 40 for chain saw sprockets. Turning, forming, reaming and drilling operations: hourly production rate raised from 68 to 100 pieces—tool life lengthened from 3½ to 5 hours. Hobbing machine operations: hourly production raised from 43 to 65 pieces—tool life lengthened from 3916 parts per tool to 5874.

Rycut is available in a wide range of analyses: Rycut 20 is a case carburizing, oil hardening steel, with balanced composition. Rycut 40 annealed attains greatly varied strength and toughness, depending on heat treatment, making it suitable for an unusually wide range of applications. Rycut 50 annealed may be preferred (to Rycut 40) for parts with large mass or applications requiring higher mechanical properties. Rycut Heat Treated, stress relieved, assures uniform properties and machinability—carbon content is matched to bar size. Call Ryerson for any alloy requirement—and get top technical help, too.

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Portrait of Khrushchev: Cunning, Dangerous and Brutal

Now that the world knows what a so-and-so Khrushchev is, you would think more people would get "on" to him. But many won't.

He did what many of us thought he would do: Test nuclear bombs to the extent he wanted to, then say he would stop if we stopped. But the silly thing is that his words and statements are given to the world as if they meant what they said. They don't.

We must stop listening to him unless we know what he is. And that, my friends, is something that is hard to put down in socially acceptable, Anglo-Saxon words.

Khrushchev is the fellow who came up from the earth. He knows all the tricks of the trade. He is cunning. He is of old hard-bitten stock. He is an atheist who turns decent peoples' stomachs when he calls on God to witness some of his mouthings.

He also is the fellow who helped draw up the murder list in the middle 1930's when Stalin was "cleaning house." Now, Khrushchev is cleaning house in a little different way. He isn't openly in the murder business since the Hungarian revolt. But he is sending to limbo those who threaten his position.

Khrushchev understands the Christian and Judaic ways of thinking. He knows how the Buddhists think, what the Moslems will do or not do. He plays a simple tune to each of these religions or philosophies. He uses their words knowing well that many may fall for this pseudo sincerity and studied hypocrisy.

To assume for a minute that Khrushchev is just a dumb peasant who knows his way around is really stupid. And to believe that he is in trouble and is hanging on by the skin of his teeth is also foolish. Just as he has fooled us, so has he fooled the Russian people and some of the high-muckety-mucks in his own party. The rest he has cowed by his brutality and bare-knuckle power plays.

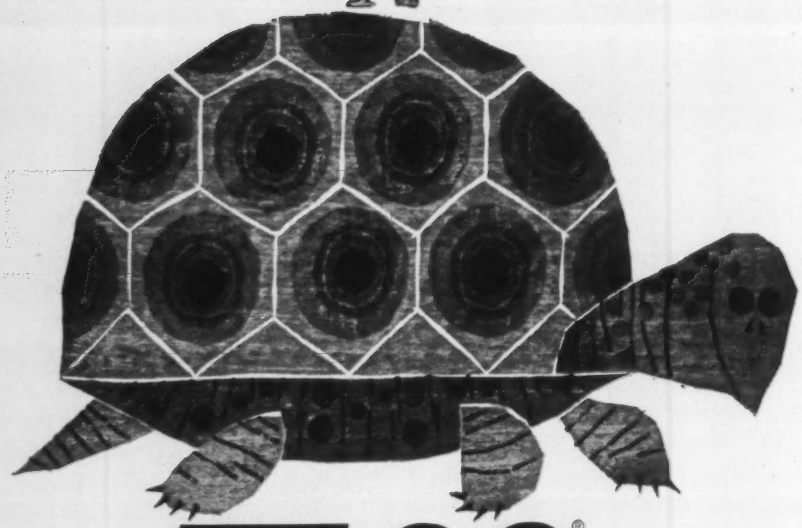
Talk about how Russia needs buffer nations and wants peace has nothing to do with Khrushchev. He is running the country. It is he and his crowd who call the shots, lie, connive, build straw men to knock down, hoodwink simple Americans, British, and Indians.

This is the man we are to "deal" with: A man who understands and uses power, cunning, brutality—and if needed—murder.

Tom Campbell

Editor-in-Chief

WHAT SHELL IS TO A



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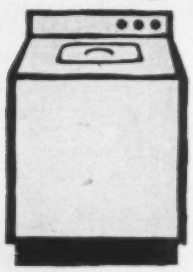

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More New Plant Spending Due

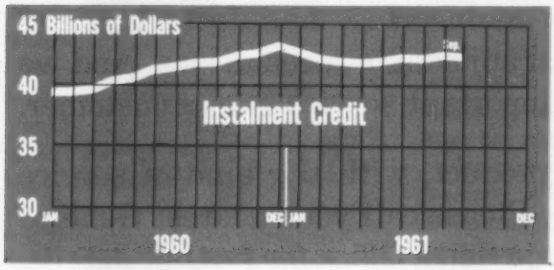
Forecasters disagree on the probability of more spending for new plants and equipment. Some private services say there will be little or no change. One claims there will be a 5 pct increase next year to a level of $37 billion.

Most forecasts are based on current discouraging capacity-demand ratios.

But four developing factors in the business economy point to a definite increase in new plant and equipment spending: A need to offset higher labor costs, competitive need for new products, need to compete in world markets and need to meet demands of new defense spending programs.

Consumers Reduce Their Debts

Consumers remain cautious. This is evident in the September instalment credit showing. In September, for the fifth month this year, consumers paid off more



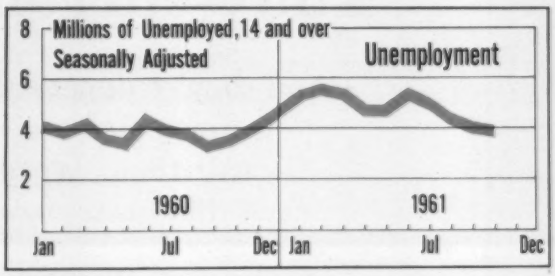
instalment debts than they took on. Outstanding instalment credit for the month fell to $42.5 billion, down from $42.6 billion in August.

In one sense, consumer credit is another indicator showing shock-wave effects from labor troubles in the auto industry. The steepest cutback in instalment credit in September hit automobile credit. Seasonally adjusted, this credit class fell by $135 million. Showing best gain for the month: Personal loans.

Payments Balance Concern Grows

The U. S. balance of payments in 1962 will be under tougher government scrutiny than ever before. Clamps will have to come down. The President's traveling troupe of cabinet members told this to the Japanese—more so than the American public has been told.

U. S. companies with foreign investment plans in the works should view them in the hard light of effect on the trade balance. Some types of investments will be quashed, others boosted.



Jobless Picture Remains Gray

The jobless picture is still mostly gray. In October, for the eleventh straight month, unemployment snagged at a near-7 pct rate. The exact seasonally adjusted rate was 6.8 pct.

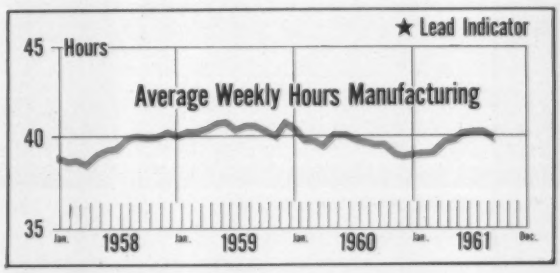
In the short-term aspect, only a sudden spurt in auto sales and production will likely turn the jobless tide.

And the effects of any auto industry pickup will have to be quick as well as substantial if a huge year-end jobless total is to be prevented. Labor Dept. analysts point out that if the present jobless rate continues, the nation in January will have 5.5 million persons unemployed. This will be due to seasonal factors. Presently, some 3.9 million are without jobs.

Factory Workweek Hours Slip

The average factory workweek fell in September to 39.6 hours, down from 40.1 hours in August. This drop does not reflect the general state of business. If anything is proved, it is that the auto industry, and its segments, play a big part in the business economy. The September drop in factory workweek was due chiefly to strikes in General Motors plants.

A measure of the auto industry impact was previ-



ously seen in a $400 million drop in income of manufacturing employees in September.

With autos aiming for a 600,000 unit production month in November, the workweek should get a big boost, at least by December this year.

General Electric Makes Eddy-current-coupling Drives

And they're dependable drives. The complete line includes water-cooled and air-cooled eddy-current couplings. We call them KINATROL* drives. Ratings are from 1 to 150 horsepower, operating from standard a-c power.

A General Electric KINATROL drive is not just another eddy-current coupling. For instance, in the water-cooled coupling, water control is packaged. You'll see much less external piping. Furthermore, the coupling is protected from flooding—and the air gaps are dry, preventing corrosion.

KINATROL couplings are compact, field proven and dependable. General Electric has had a good deal of experience in the engineering, manufacturing, and application of packaged adjustable-speed drives. And we know how important service is to a customer.

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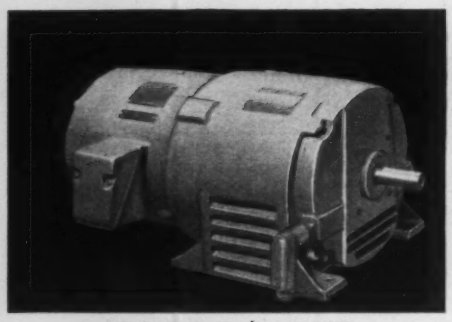

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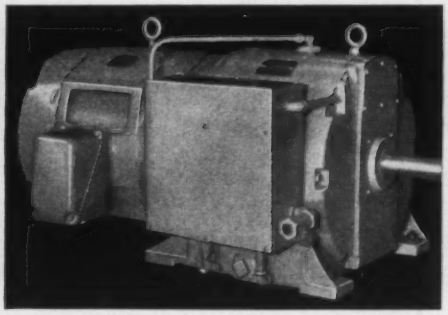
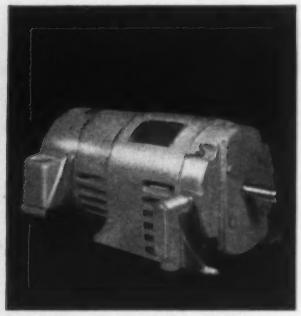


WATER COOLED, 25 to 150 HP



AIR COOLED, 1 to 5 HP

DIRECT CURRENT MOTOR AND GENERATOR DEPARTMENT

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USWA: Wages an Issue Regardless of Prices

Any idea that the Steelworkers will play dead on wages next year can be dismissed. And this is regardless of whether or not the steel industry holds the price line until the Steelworkers' contract runs out next June 30.

This was made clear last week by I. W. Abel, secretary-treasurer of the USWA. In a Cleveland speech, the USWA officer declared:

"The Steelworkers are not going to sit uncomplaining when they see profits skyrocket because of increased productivity, and such productivity reflected only in greater dividends to stockholders, or plowed back into new automated plants which will displace even more workers."

Mr. Abel obviously had in mind implications drawn from President Kennedy's recent messages to the industry and the USWA. They hint that if the industry holds the price line, the Steelworkers should limit their wage demands "to a level consistent with price stability."

Mr. Abel also cited other issues that may have importance in the 1962 contract talks. These include grievance procedures, technological unemployment and retraining of workers, contracting out work, and some disability allowances.

Also last week, David J. McDonald, USWA president, implied that the short work week may also be a goal of next year's negotiations. In a message to a conference of District 16 Steelworkers, he said fewer hours of work with no loss in take-home pay "may become a reality a lot sooner than some people think."

UAW: Maytag Contract Has "Bonus" Plan

A bonus plan to make up for an annual downtime period is a key factor in a labor contract between Maytag Co. and its UAW local.

The feature establishes a voluntary year-end bonus plan, a long-time goal of the union. The bonus is planned to take up the slack from the company's annual inventory shutdown.

The bonus will be created by withholding payment of 2 pct of each participating employee's gross earnings each week. This will be supplemented by a company contribution of approximately the equal amount.

The overall contract is similar to the UAW pattern but retains employee participation in health insurance and holds lay-off benefits under SUB to current levels.

The agreement was subjected to ratification by the membership.

W-H Pay Rulings Speeded

The U. S. Labor Dept.'s speed-up of Walsh-Healey minimum wage cases is bringing quicker wage determinations involving metalworking industries.

The Labor Dept. has begun a program to end Walsh-Healey delays. A prevailing minimum wage has been set for the office equipment industry. And the Secretary of Labor will soon set minimums for the machine tools, fabricated structural steel, electronic equipment, and motors and generators industries.

Under the Walsh-Healey Public Contracts Act the Labor Secretary has authority to determine minimum wages on work done on government supply contracts of $10,000 or more. Though the wage set is limited to government contracts, W-H determinations tend to inflate wages, generally.

The minimum wage set for the office, computing, and accounting machines industry was $1.55 an hour. Management had stated the prevailing wage in the industry was a little over $1.27 an hour; the unions sought $1.81 an hour. This shows the usual "split-the-difference" ruling by the Labor Dept. The office equipment industry sells about $230 million worth of products to the government each year.

In the machine tools case, union officials asked the Labor Secretary to set the minimum as $2.15. Industry officials said the minimum should be $1.60. The union's request included 22 cents for fringe benefits. It was the first time labor has sought to add fringe benefits in a W-H case. A decision to include fringe benefits in the machine tools determination could effect all industry cases in the future.

In the fabricated structural steel case, industry said the prevailing minimum should be set on a regional basis with separate determinations for galvanized and non-galvanized structural steel fabrication. They indicated six regional rates, varying from $1.07 to $1.78, should be set for the non-galvanized steel segment. They suggested one separate rate, $1.39, for the galvanized segment of the industry. The unions asked for a $2.10 minimum on a nationwide basis, with no difference between galvanized and non-galvanized.

He detects low-pressure air power

A pressure drop between air compressor and air tools *steals power dollars* like a thief in the night. Each tool slows down a little; each piece of pneumatic equipment loses some of its power. Although the slowdown may grow undetected, *plant efficiency suffers.*

A Gardner-Denver Compressed Air Specialist is an expert at diagnosing off-pressure air power. Dedicated to keeping compressed air systems at peak efficiency, he often prescribes simple remedies which restore normal air pressure without adding a new compressor. He will suggest a test for air leaks, and a search for fouled, undersized or extended air lines. He may recommend a schedule of preventive maintenance.

If he should find that the need is for a larger compressed air supply, he may recommend additional compressor capacity from Gardner-Denver's complete line. For a compressed air check-up in your plant, call your nearest Gardner-Denver branch.

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★ How Much Defense Money?

The proposed military budget for fiscal 1963 has already run into some heavy crossfire. It weighs in at $53 billion, almost $2 billion more than 1962's $51.1 billion.

Administration budgeteers haven't scrutinized it yet, but the fiscal '63 budget is being called 'fat' in some quarters. Money requested would go for: Foreign military aid; the office of the Sect. of Defense; as well as Army, Navy and Air Force funds.

President Kennedy's plans for a balanced budget next year won't be helped by more defense spending. This accounts for some of the criticism.

The long-range plans from which this budget evolved are being attacked. The defense comptroller's office has prepared "program packages." They cover the next three to six years' military spending.

Critics say parts of the package will be almost useless when delivered. The Navy's request for three conventional aircraft carriers is a prime example. Sen. William Proxmire, D., Wis., criticized the move. He said, "With the rapid pace of invention and development in modern military techniques, it hardly makes sense to order aircraft carriers . . . which won't be delivered for at least five years."

Secretary of Defense McNamara's office has not made the final decision on the military budget. The figures are subject to international pressures. Figures submitted are: Army, $12.7 billion; Navy, $15.6 billion; Air Force, $21.3 billion; Sect. of Defense, $1.7 billion; and military aid, $1.7 billion.

If Berlin or Viet Nam gets hotter, the defense budget could go up. If they get cooler, it could go down. However, President Kennedy says he will ask for more defense money next year.

Big chunks of the proposed budget are scheduled for missile weapons systems, including $2 billion for the Polaris and $2 billion for the Minuteman.

■ Hodges: How Much A Free Trader?

Divergent opinions of Commerce Secretary Luther Hodges' position on foreign trade are forming in Washington. One side sees him as backing free trade; the other side sees him telling the Administration to slow down on an all-out free trade push.

The split view comes from Hodges' statements on U. S. trade policy. The Commerce Secretary says the U. S. must move in the direction of freer world trade to assure its share of international markets. He generally favors lowering tariffs and import quotas.

But, in a more protectionist frame of mind, he says there must be proper safeguards for American industry.

Hodges may be setting the tone for the Administration's battle to get Congress to tear down some of our trade barriers. To get a free trade doctrine, the Administration may have to offer safeguards to certain Congressmen for industries in their districts.

■ Anti-Trust Probe Aims at Aluminum

The anti-trust investigation of the aluminum industry is still going strong. The Senate antitrust and monopoly subcommittee, headed by Sen. Estes Kefauver, is on the trail of price fixing in the industry.

The probe has all the makings of an "electric manufacturers" price fixing case. Bernard Fensterwald, subcommittee staff director, told The Iron Age he is seeking "records of aluminum company officials who may have been engaged in illegal activities."

Mr. Fensterwald said earlier reports that the investigation had been shelved were false. He said: "We are going ahead with the investigation, but I can't say in what direction we will go."

The subcommittee subpoenaed information from some 20 small extruders in the industry. It also asked the major aluminum companies for information. And staff members visited a dozen or more companies.

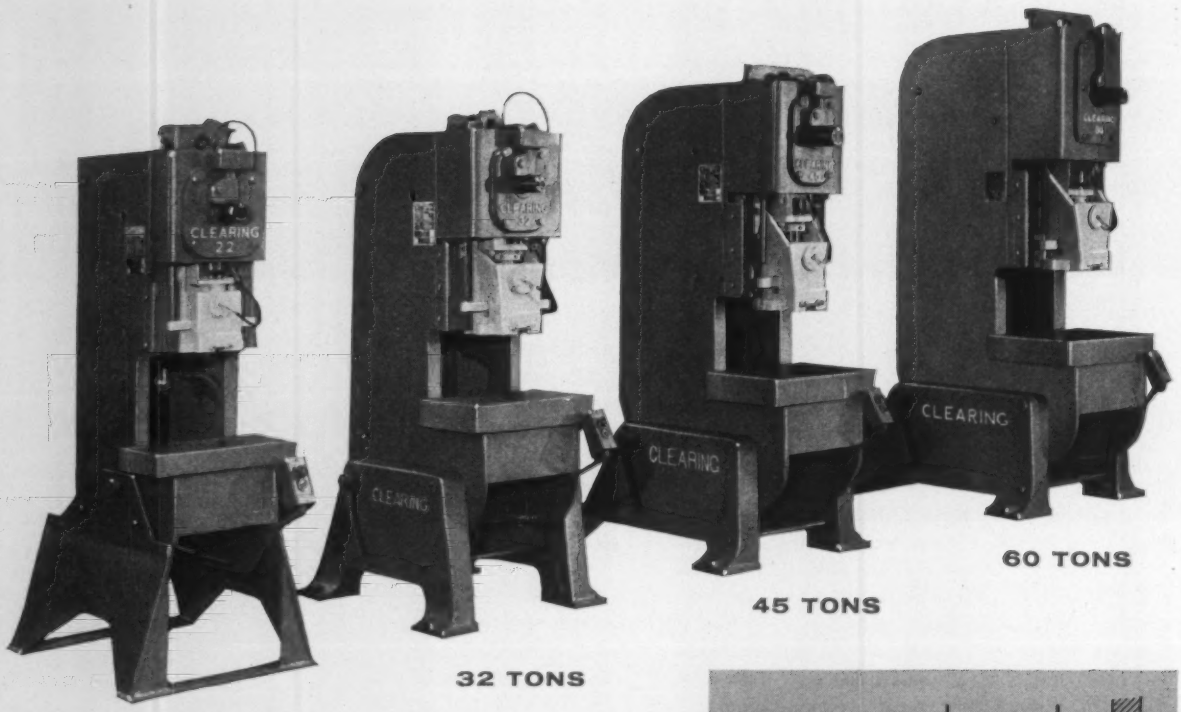
■ High Court Reviews Anti-Merger Defense

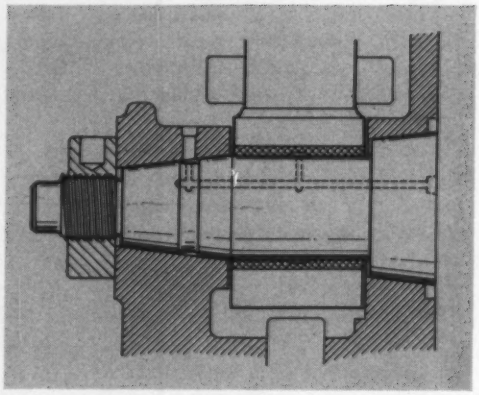
The "failing company doctrine" defense against antitrust suits is in jeopardy. The U. S. Supreme Court has agreed to review this corporation defense against government anti-merger restrictions.

The high court has agreed to a Justice Dept. plea to review a lower court decision on the defense. The lower court dismissed an antitrust suit attacking the acquisition of Herring-Hall-Marvin Safe Co., by Diebold, Inc. Both are bank vault equipment firms.

The Justice Dept. claims corporations are being allowed to use the "failing company" defense more and more because of loose interpretation in lower courts.

It allows a firm to justify acquiring another firm which is failing financially. The defense is that a competitor buying a company which is insolvent does not substantially reduce competition in the field.





The Clearelease mechanism makes it possible to unstick the press in a matter of minutes. A taper wrist-pin in the press slide provides instant release. Simply loosen locking nut and tap wrist-pin in.

No Fear of Getting Stuck With a Clearing Torc-Pac

"Sticking" a press is a problem that can send a production manager to the nurse for tranquilizers, as you know. And presses **do** get stuck, let's face it. But here's what Clearing has done about it on the new Torc-Pac line of O.B.I.'s. "Clearelease", an ingenious mechanism built into the press slide makes it possible to unstick the press in a matter of minutes. It's simple and fast and the press is back in operation before tempers can rise.

There are a lot of improvements on the new Torc-Pac. A clutch and brake unit that is as quiet as it is maintenance-free is an important plus. Controls are shock mounted. The streamlined design of Torc-Pac conserves floor space. Feeding is easy from any direction. Find out more about the new Torc-Pac. Ask for literature today.

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Will Free World Try Free Trade?

Businessmen and statesmen on both sides of the Atlantic are pondering this vital question now: Is there still a place for protectionist trade policy among the interdependent industrialized nations of the West?

The answer will determine the course of Free World trade.

England's move into the Common Market is bringing the issue to a head. Other nations are following England's lead. Denmark and Turkey have opened talks with the Six. And rumblings from Canada indicate it too would like some sort of affiliation.

The U. S. has encouraged this advance toward European unity ever since the Marshall Plan. Now, it must decide whether to withdraw into a hemispheric trading group, or press for closer cooperation among the Atlantic Community, and perhaps eventually for a community of the Free World.

Rep. Henry S. Reuss (D., Wis.) urges the U. S. to form a Common Market for the entire West. In a report for the Senate-House economic committee, he warns that the new Common Market alignment "could divide the Free World in two."

Britain's move to the Common Market has taken economic integration problems out of a strictly European context and has thrown them, once and for all, into the free-world arena.

U. S. Exports Slump But Top '60 Pace

U. S. exports dropped again in September, third straight month of decline. But the export total for 1961 is still ahead of 1960's pace.

Exports in September totaled $1.613 billion, according to the Dept. of Commerce. This is 2 pct below the August total of $1.653 billion but above 1960's September total of $1.610 billion.

For the first three quarters of '61, exports were at an annual rate of $19.832 billion. This is 3 pct higher than the annual rate of $19.318 billion for the first three quarters of 1960.

U. S. imports climbed again in September, to $1.249 billion. For the first three quarters of 1961, imports were at an annual rate of $14.211 billion, or about 5 pct under 1960's third-quarter rate.

Metalworking Survey Shows Profit Areas

A three-part industrial survey pinpoints 150 profit opportunities in Canada's metalworking industry.

Report One shows how U. S. companies can set up manufacturing agreements with more than 750 Canadian companies on a royalty or joint venture basis. Report Two is a study of Canadian export opportunities in the U. S. market. Report Three shows the major "fabrication gaps" in Canadian industry.

The three profit-guide reports are available from the Ontario Dept. of Commerce and Development, Box M, Suite 1307, 680 Fifth Avenue, New York 19.

Israel Wants More U. S. Manufacturers

Israel could use double the 200 U. S. companies now operating there. It has a fertile market area for manufactured products and agreements for export to 27 other countries, says Pinhas Sapir, Minister of Commerce & Industry.

Mr. Sapir's U. S. host, Jessop Steel Co., is finishing a know-how contract for setting up a cast-to-shape tool and stainless steel operation in Israel.

France Steel Buildup Set At $1.8 Billion

France will increase crude steel production in the next five years from 17.2 million tons in 1960 to 24.5 million tons in 1965.

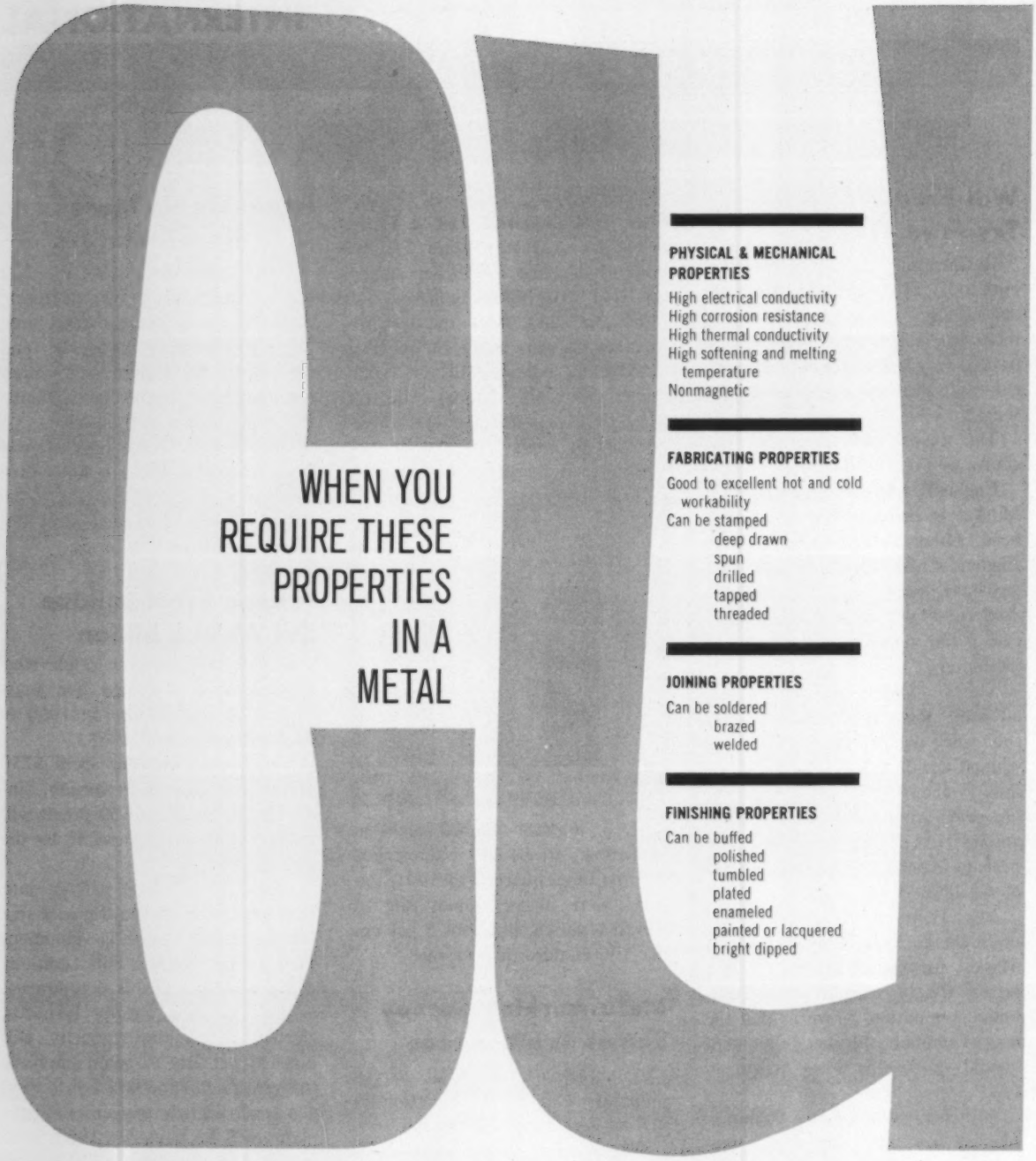
The French industry spent $250 million last year on expansion. Sinter capacity increased 50 pct. It will reach 9-million-ton capacity by the end of 1961.

About $1.8 billion will go into steel expansion during the next five years, France's Fourth Development Plan period. Rolling mill additions will take 47 pct of this expenditure.

With 27 new electric furnaces, electric steelmaking capacity will jump 50 pct. But the main emphasis in France's buildup will be on oxygen steel: 12 new oxygen converter plants will be built. By 1965, converters will account for 27 pct of French steel capacity.

Atlas Know-How

India's Hindustan Steel Ltd. has signed a multi-million-dollar agreement with Atlas Steels of Canada Ltd. to supply know-how and training services. Hindustan is building an $80 million steel mill at Durgapur. It will turn out carbon and alloy tool steels, machinery steels, and stainless and special purpose steels.



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Trend to Standard Drives

Electrical equipment manufacturers note that more and more steel rolling mills are specifying interchangeable drive equipment. One new mill has been designed to use electrical drives and generators identical with those of the secondary mill that it feeds. Duplication is also being extended to control systems. Steel mills are aiming for reduced spare-parts inventories.

Key to Longer Tool Life?

Engineers have come up with a new way to fabricate cutting tools. You'll hear more and more about the electrophoritic technique which deposits carbide coatings on ductile tool shanks. Here's a sample of what's in store. Carbide-coated spade drills last three times longer than uncoated cobalt drills of the same geometry.

Uranium Gets Automation

An automated transfer machine, which will turn out uranium components for electrical power generators, is now in the final testing phase. Lending importance to the machine's development is the growing demand for uniform, high-quality uranium parts. With its precisely-controlled production cycle, the new transfer unit will serve as a high-volume source of supply.

On Protecting Aluminum

Automotive corrosion is the concern of a recent report issued by Ford Motor Co. It lists the following process variables as correct for aluminum. During anodizing, the temperature should be about 70°F. For sealing, temperature should be kept as much above 205°F as possible. Also, 15 minutes of sealing time is a must.

Mills Up Scrap-Intake Rate

New steelmaking speeds force mills to think in terms of tons per minute instead of tons an hour. Openhearths belch out 100 tons per hour. Basic oxygen vessels hit 225 tons per hour. Result? A one-minute delay equals an hour's delay in the old days. Mills are attacking this bottleneck with mass scrap-charging systems. One now in use on two basic oxygen vessels pours in scrap at rates up to 90 tons per minute. Similar methods for openhearths are under study.

Tiny Battery Cells

Pilot production of the first silver-cadmium button cells is now underway. These hermetically-sealed, rechargeable battery components are just slightly larger than a half-dollar. According

SILVER-CADMIUM CELL: Rates at 1.4 v.

to Yardney Electric, the units have up to 75 pct more capacity than ordinary button cells of the same weight and volume. One interesting possibility is their use as a power source for truly portable machine tools.

Stockroom Computer

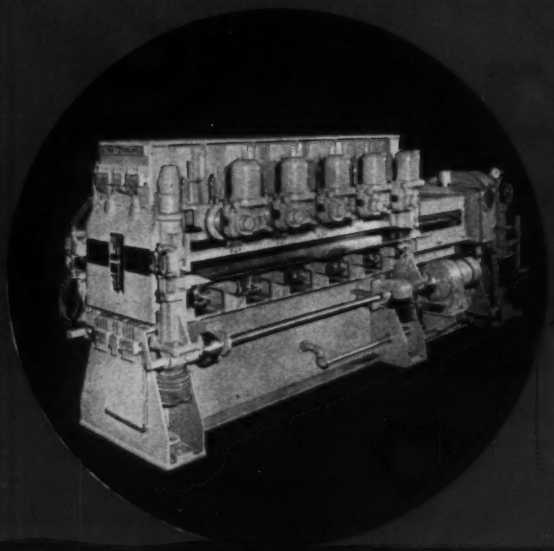
Want to lower your inventory costs? Using a computer to determine economic substitutions for exhausted items may be the key. A major metalworking company in the Midwest tried this method. It reports savings of $55,000 annually. Most of the savings accrued through a reduction in total inventory. However, it's agreed that there has also been an intangible but important decrease in manufacturing time.

Extends Crankshaft Life

One of the leading automakers is installing a Tufftriding setup for crankshafts. Backbone of the Tufftriding process is a special molten salt bath. When the salts contact ferrous shafts, they diffuse nitrogen into the metal's surface to a depth of about 0.02 in. This free nitrogen curbs incipient cracks and extends fatigue life. Iron carbides, also liberated in the bath, form tough protective layers on low-alloy shafts.

ROLLER LEVELERS

What kind of roller leveler do you need for your particular product? Want high speed? We have high speed levelers. Want an economical model for less demanding work? We have one of the best models in the business. Want a quick opening head? We have either hydraulic or motor-operated or hand-operated models. Want centralized lubrication? We equip all levelers with centralized lubrication with the exception of a few models. Want antifluting? We have it. Want individual adjustment or centralized adjustment? We have both types. Want more roll life per redressing? All of our rolls are induction hardened. Want an existing leveler reconditioned? We have an efficient service setup. What size leveler do you need — 1¼" up to 18" diameter work rolls? We make all sizes and types. In fact, the Aetna-Standard Division of Blaw-Knox is one of the major manufacturers of Roller Levelers. For information, write to Sheet and Strip Sales, Aetna-Standard Division, Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh, Pennsylvania.



This Roller Leveler has individual motor-operated backup roll adjustments. 1¾" dia. x 72" face . . . 21 rolls.

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Pros and Cons

Sir—I am interested in your article, "When to Consult a Consultant" (p. 67) in the October 26 issue. I would appreciate receiving reprints.

Let me add that you have done an excellent job of condensing a lot of the pros and cons concerning this subject, at a time when many companies are facing the same decision. —Nicholas G. Fanos, executive vice president and general manager, Frederick Iron & Steel, Inc., Frederick, Md.

Friendless Business

Sir—Your editorial, "Business Is Friendless" (IA, Sept. 28), as reprinted in the Chicago Tribune, is wonderful. Guys like you that write that way ought to be read in publications of wide circulation.

Business is friendless, but the blame is partly its own. In many instances the ills of the body politic are directly due to management's lack of vision through the years.

Right now we're in the hands of the "multis." By that I mean the many multi-millionaires' sons that have always had it easy but would spend your last cent and my last cent to get a vote. Labor goons and management "weakies" are bad, but the multis are horrible—the country can't survive them forever. They don't and never will know the score. Now is the time when business should be shouting from the house tops, fighting the things that will not only destroy business, but the Republic as well.

Guess we're all to blame. We should be citizens first, business men, doctors, lawyers, politicians, laborers, union leaders and merchants second. Possibly we should have a new party—The American Party—in this country, which would be dedicated to the best tradition of the country for the common goals of a free people. I'm afraid that some day the patriots will really have to march on Washington if things don't begin to change before long. . . .

You ought to spend the rest of your life talking over the television and radio because you really can dish it out. If business and management had any vision at all, you would be on the air this minute.—Robert H. Crawford, M. D., Burlington, Ia.

Common Sense

Sir—I write to congratulate you on your editorial (Foot-in-Mouth Disease: We Can Do With a Little Less) in the Oct. 12 issue. To me it is so opposite that I could not resist sending the editorial to Senator Humphrey. I'm sure he will receive many other copies from other readers.

May I compliment you in general on your editorials in the past few years. Seldom do I read so much consistent common sense and "Libertarian" philosophy in other publications, regardless of the type. Keep up your good work.—W. B. Mann, president, The Wolfe & Mann Mfg. Co., Baltimore, Md.

"That's funny . . . my brother sells the same stuff."

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No Kiss of Death

We're not superstitious, but we have to admit that some national magazines have the reputation of putting the kiss of death on people who appear on their covers.

Everyone can recall the cover stories of athletes, political figures, and others who have been the subject of big cover stories. Almost invariably, they seem doomed to defeat. Baseball pitchers come up with sore arms. Football coaches see their teams upset. Candidates go down beneath landslides.

We are happy to say that we have had the opposite effect with our cover stories. Many men have gone on to greater things shortly after appearing on our covers.

GM and Ford—Last week one was called to mind. In a major announcement by General Motors Corp., Semon E. Knudsen was named general manager of the giant Chevrolet Div. You may recall seeing Mr. Knudsen's smiling picture on our Sept. 28 cover, when he headed the Pontiac Div. No apologies are needed for Pontiac, a great division and a major responsibility, but moving over to Chevrolet has to be considered a promotion.

PROMOTED: Semon E. Knudsen, recently featured on IA's cover, has been named general manager of GM's Chevrolet Div.

In the same automotive line, you may recall that Ford Motor Co.'s then vice president John Dykstra appeared on our Nov. 10, 1960, cover. Shortly thereafter, he was named president of Ford.

Incidentally, our Detroit editor and automotive authority A. E. Fleming worked on both stories. A kingmaker?

Scientific Seahunt

More and more the sea is growing important to man. Last week we ran a story on the prospects of mining the ocean for its mineral wealth (IA, Nov. 9, p. 85).

But minerals are not the only attraction the seas have for scientists and engineers. Aerojet-General Corp. recently pointed out some others.

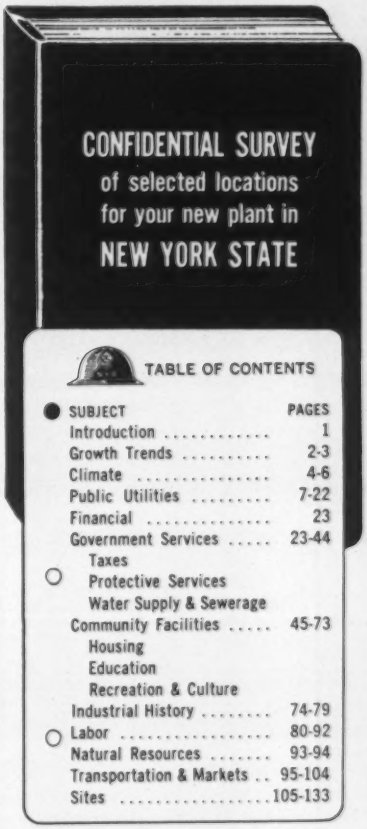
It's just possible, says Aerojet, that the oceans may becoming "instant" launching pads for rockets. Capt. Robert Truax (USN-Ret.) has pioneered in this concept for Aerojet.

Easier and Quieter—Advantages of the idea are many. Ocean launching sites could eliminate all the elaborate facilities needed on land. They would be "self-healing," with no need to re-build stands after firing. They offer tremendous mobility. And they provide more safety, and less noise.

Undersea School—While underwater, man can also learn from the fish. In order to conquer "inner space"—the watery underworld—we must study the creatures who can live there. That's the opinion of Lynn A. Hannum, of Aerojet's Advanced Research Div.

Among the things he wants to learn: How they move through the water at high speeds without creating any appreciable "drag."

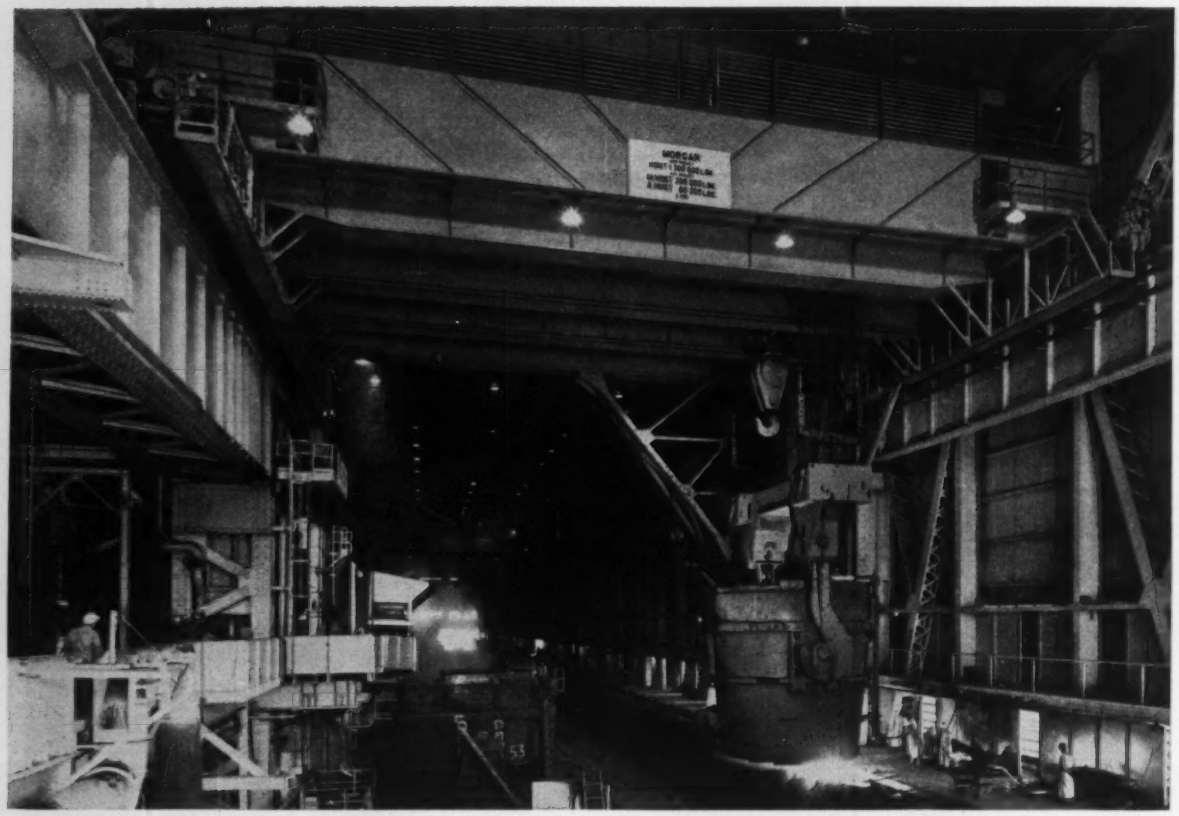
FREE TO COMPANY OFFICIALS LOOKING FOR A NEW PLANT SITE



TAILOR-MADE REPORTS. The table of contents shown above is typical of the survey of selected plant locations that we will prepare for your organization. Simply send your specific requirements on your business letterhead to Commissioner Keith S. McHugh, New York State Department of Commerce, Room 4317, 112 State Street, Albany 7, N. Y.

Keith S McHugh

Keith S. McHugh, Commissioner
New York State Department of Commerce



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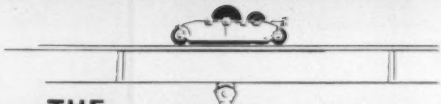

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COMING EXHIBITS

Marine Supplies & Equipment Show—Nov. 15 - 17, Hotel Roosevelt, New York City.

Canning Machinery & Supplies Show—Jan. 21-24, Americana Hotel, Bal Harbour, Fla. Assn. headquarters, 4630 Montgomery Ave., Washington.

MEETINGS

NOVEMBER

National Electrical Manufacturers Assn.—Annual meeting, Nov. 13-17, Traymore Hotel, Atlantic City. Assn. headquarters, 155 E. 44th St., New York.

National Foundry Assn.—63rd annual meeting. Nov. 15-17, Savoy-Hilton Hotel, New York. Assn. headquarters, 4321 St. Charles Rd., Bellwood, Ill.

National Assn. of Aluminum Distributors — 11th annual convention Nov. 15-18. Arizona-Biltmore Hotel, Phoenix, Arizona. Assn. headquarters, 1900 Arch Street, Philadelphia.

Society of Carbide Engineers—Annual meeting, Nov. 18, Belmont Plaza Hotel, New York City. Society headquarters, P. O. Box 45, Newington 11, Conn.

American Society of Mechanical Engineers—Winter annual meeting, Nov. 26-Dec. 1, Statler-Hilton Hotel, New York. Society headquarters, 2 E. 48th Street, New York 17.

Plumbing Brass Institute—Annual meeting, Nov. 27-29. Savoy-Hilton Hotel, New York City.

American Management Assn.—Materials conference, Nov. 27-29, Savoy-Hilton Hotel, New York City. Assn. headquarters, 1515 Broadway, Times Square, New York 36.

American Institute of Steel Construction — Annual meeting, Nov. 27-30, Boca Raton Hotel, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.

(Continued on P. 22)

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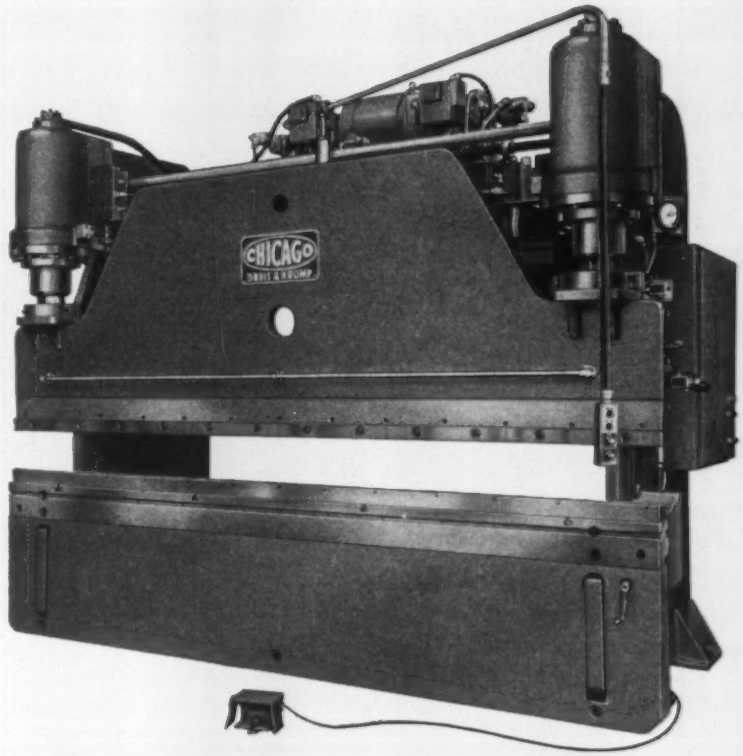

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MEETINGS

(Continued from p. 21)

National Assn. of Corrosion Engineers—Regional corrosion conference of the Southeast Region, Nov. 27-Dec. 1, Key Biscayne Hotel, Miami, Fla.

DECEMBER

Malleable Founders Society—Semi-annual meeting, Dec. 1, Hotel Sheraton-Cleveland, Cleveland. Society headquarters, 781 Union Commerce Bldg., Cleveland.

American Institute of Chemical Engineers—54th annual meeting. Dec. 3-6, Hotel Commodore, New York. Institute headquarters, 25 W. 45th St., New York.

Spring Manufacturers Assn. — Annual meeting, Dec. 5-6, Biltmore Hotel, New York. Assn. headquarters, Box 1440, Bristol, Conn.

National Assn. of Manufacturers—Annual meeting, Dec. 5-7, Waldorf-Astoria Hotel, New York. Assn. headquarters, 2 E. 48th Street, New York 17.

American Ordnance Assn. — 43rd annual industrial preparedness meeting, Dec. 6, Waldorf-Astoria Hotel, New York. Assn. headquarters, Mills Bldg., Washington, D. C.

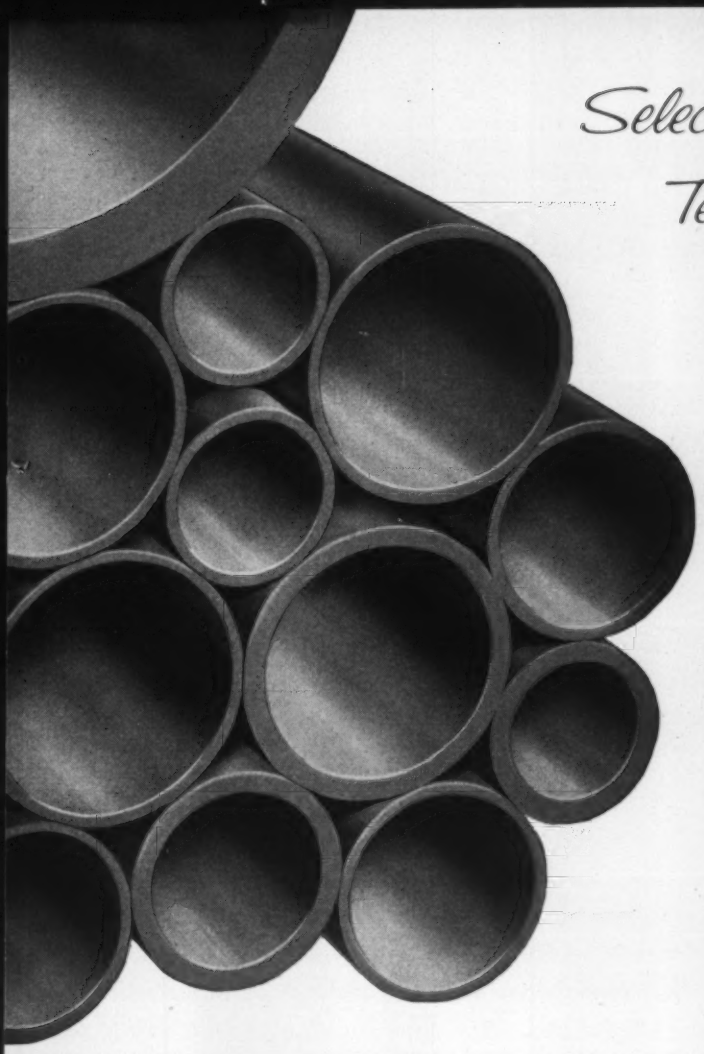
Metallurgical Society of AIME—19th Electric furnace conference, Dec. 6-8, Penn - Sheraton Hotel, Pittsburgh.

JANUARY

Assn. of Consulting Management Engineers, Inc. — Annual business meeting, Jan. 15, University Club, New York. Assn. headquarters, 347 Madison Ave., New York.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 15-19, Mountain Shadows Hotel, Scottsdale, Ariz. Assn. headquarters, 105 W. Madison St., Chicago.

Aluminum Assn.—Annual meeting, Jan. 24-26, New York.



Selection of finest raw materials

Testing every step of the way

Inspection to rigid standards

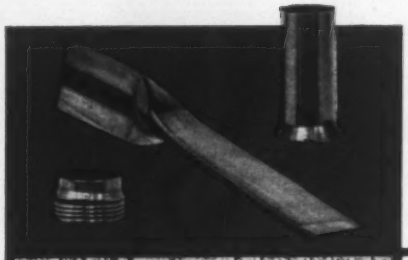
Assure 100% dependability for

OHIO WELDED PRESSURE TUBING

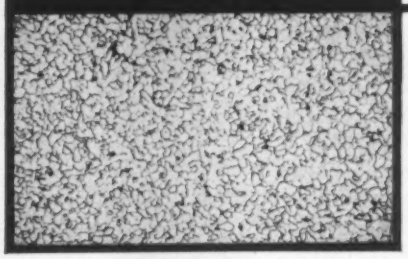
You can be sure — doubly sure — of utmost tubing dependability when you specify Ohio Welded Pressure Tubing — *made by Ohio Seamless*. First, Ohio works to accepted industry standards — ASTM, ASME, and similar Federal and military specifications covering welded pressure tubing. Second, Ohio Welded Pressure Tubing is produced under a *continuous* process of quality control — not just a final test inspection to cull questionable material.

Carefully selected prime raw material is slit, edged, shaped and electric resistance welded on the most versatile and modern equipment in operation. At each and every step of the way Ohio Welded Pressure Tubing is under the scrutiny of Ohio's master tubemakers . . . making control tests at frequent intervals . . . testing random samples from each production order far beyond the limits of the usage involved.

For critical pressure piping applications . . . for condensers, heat exchangers, boilers and superheaters — in the range of sizes from ½ to 7½" OD and wall thicknesses from .028 to .375"— mark your prints "*Ohio Custom Made Welded Pressure Tubing*." There is no equivalent.



Photographs show flare, flattening and crush tests performed continuously on every order. Non-destructive tests include air, water, magnetic, eddy current and visual inspection to insure 100% dependability.



Photomicrograph of polished and acid-etched surface shows perfect microstructure of normalized Ohio Welded Pressure Tubing. Weld area running down the center is now indistinguishable and tube has become, in every sense, weldless.

OHIO

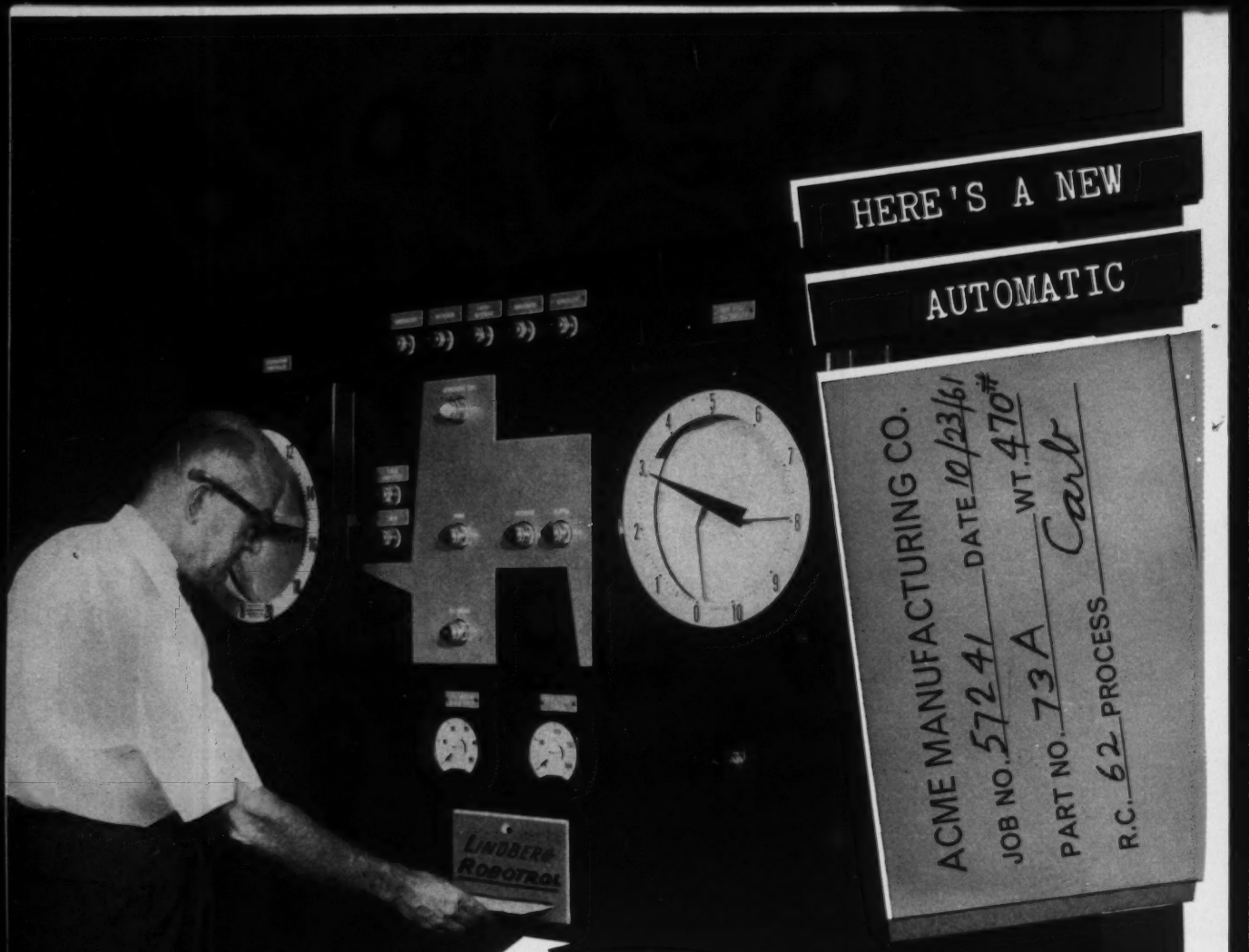
OHIO SEAMLESS TUBE

Division of Copperweld Steel Company

SHELBY • OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

Representatives in principal cities. Check leading directories:
THOMAS', MacRAE'S, CONOVER-MAST, SWEET'S, FRASER'S.



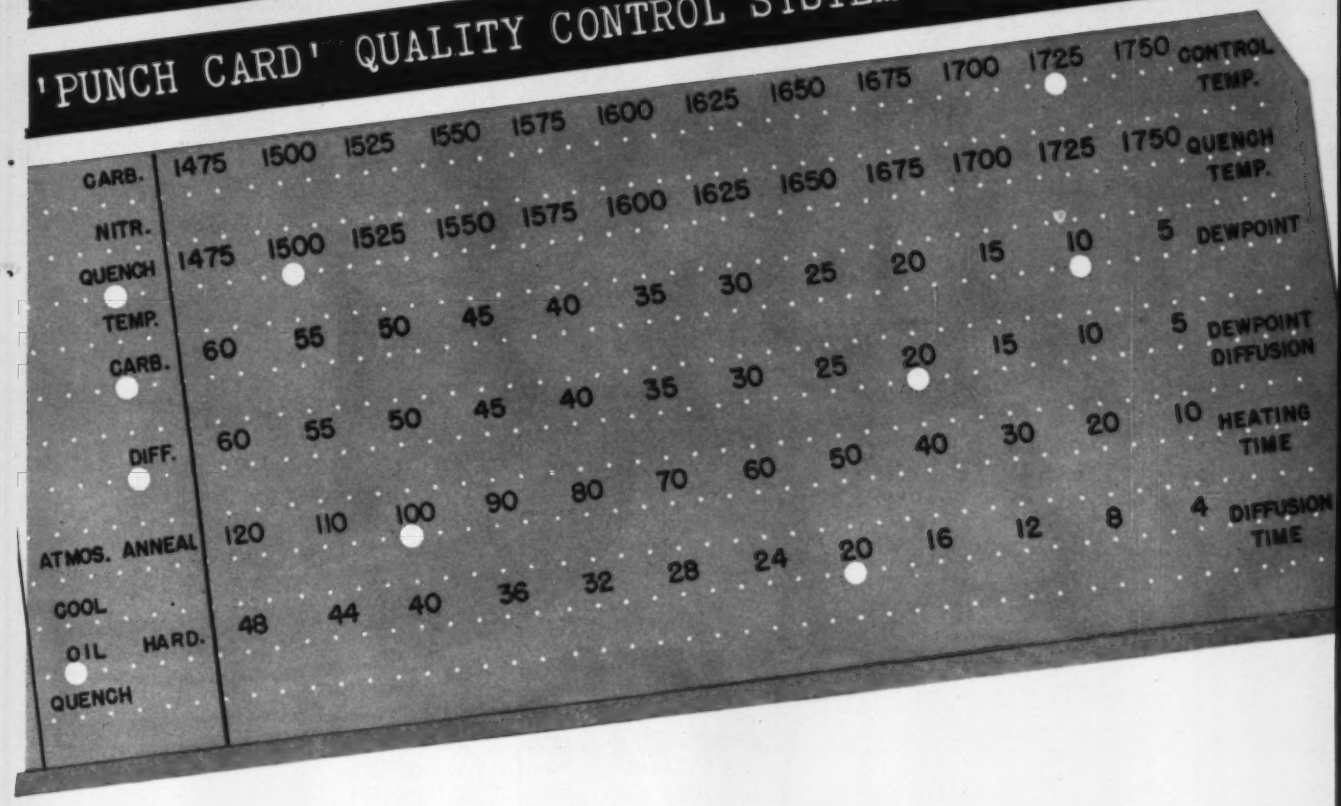
ROBOTROL

"PUNCH CARD" SYSTEM WORKS LIKE THIS

With this system a standard punch card is the job ticket. The metallurgical department punches it to set up treatment factors for desired result. When the work arrives at the furnace the operator merely puts the card in the Robotrol panel. He can't treat the work without putting the card in. He can't put it in wrong. He doesn't have to read or set instruments, adjust dew points, time carburizing and diffusing periods, decide on type and timing of quench. The punch card controls these automatically. It can provide for a variety of operations and required cautionary procedures. As the work moves on and is completed the punch card provides a permanent record of the exact treatment given it.

CONCEPT IN HEAT TREATING TECHNIQUE.

'PUNCH CARD' QUALITY CONTROL SYSTEM NOW PERFECTED.



For the first time automatic quality control in heat treating

System completely eliminates factor of furnace operator error

Provides exact record of metallurgical treatment on every job

LINDBERG ROBOTROL

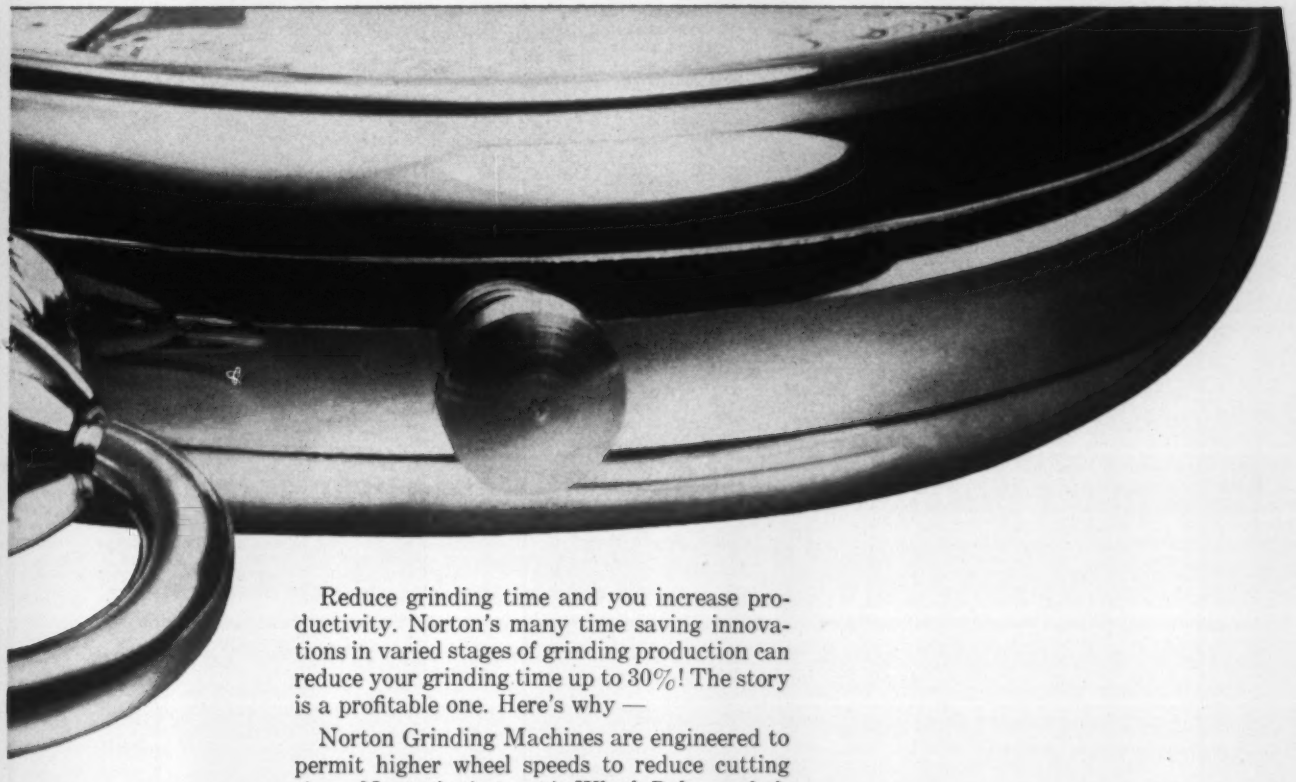
Guarantees you precise uniformity and quality in heat treating

Introduced at the recent ASM Show at Detroit, this new Lindberg Robotrol automatic quality control system has been in development for more than five years. With this punch card system pyrometers, timers, atmosphere control instruments and all the factors on which metallurgical results are dependent are set up and automatically controlled. It is practically impossible for the furnace operator to treat the work improperly.

The punch card also provides an exact record of the treatment given each job. You know exactly what happened.

The Robotrol system is extremely flexible and can be adapted to any kind of heat treating cycle. For full information consult your local Lindberg Field Representative (see classified phone book) or write us direct.

Time is the measure of productivity



Reduce grinding time and you increase productivity. Norton's many time saving innovations in varied stages of grinding production can reduce your grinding time up to 30%! The story is a profitable one. Here's why —

Norton Grinding Machines are engineered to permit higher wheel speeds to reduce cutting time. Norton's *Automatic Wheel Balancer* balances the wheel in *five seconds — on the machine.* You reduce time spent "grinding air" up to 85% because of Norton's *Automatic Wheel Contact Accelerator* which speeds the wheel to the work and compensates for work piece-diameter variation. Another advance is Norton's *Automatic Truing* which eliminates work interruptions and the *Automatic Wheel Wear Compensator* that stabilizes the grinding cycle.

Norton Grinders further add to your productivity by minimizing work spoilage with *Automatic In-Process Gaging.* In the case of surface grinders Norton *Higher Table Speed of 150 fpm* actually reduces grinding time up to 50%.

These are only some of the many reasons you can increase your productivity with Norton Grinders. They also offer accessories that literally transfer skills to machines — *ultra-fine feed,* and *automatic features* such as *steady resting, endwise locating, loading, constant peripheral wheel speed* and *hydraulically-operated feed screws* provide this competitive advantage.

The decision is yours — can you afford not to reduce the time it takes to produce your product? Can you afford not to increase your productivity? Contact your Norton man, NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. In Canada: J. H. Ryder Machinery Co. Ltd., Toronto 5.

NORTON
MACHINE TOOLS
... Making better products to make your products better

MACHINE TOOL DIVISION: Grinding and Lapping Machines — G & E DIVISION: Shapers • Gear Cutting Machines

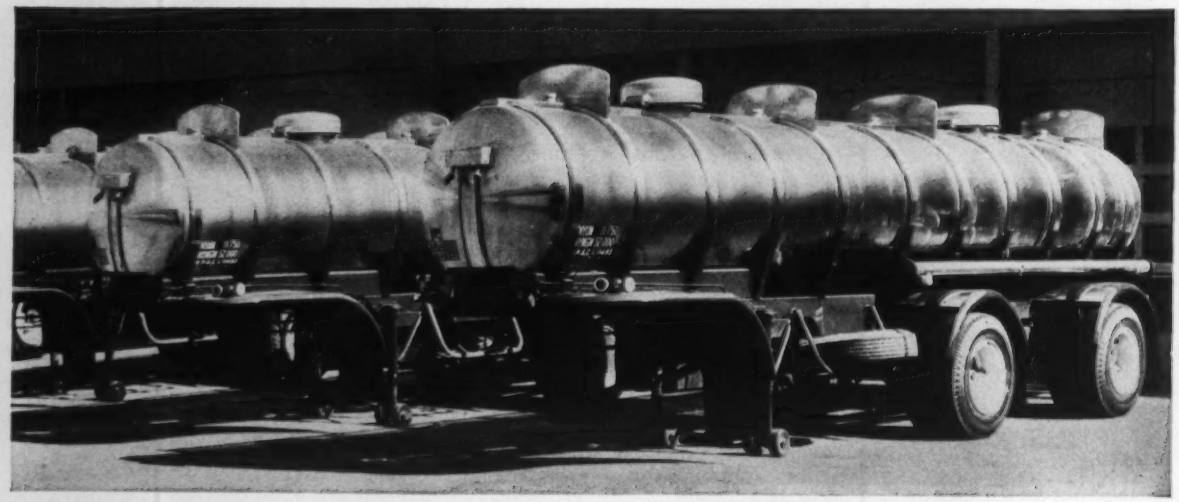
For Stainless Steel, call your nearest Steel Service Center.

Outsmart corrosion with USS Stainless Steel

What's your corrosion problem? Acid? Water? Harsh atmospheres? Solve it with Stainless Steel. Whether you operate a tank truck fleet or manufacture fine paper, whether you specify switch lamps or build skyscrapers, Stainless Steel offers unsurpassed resistance to crippling corrosion.

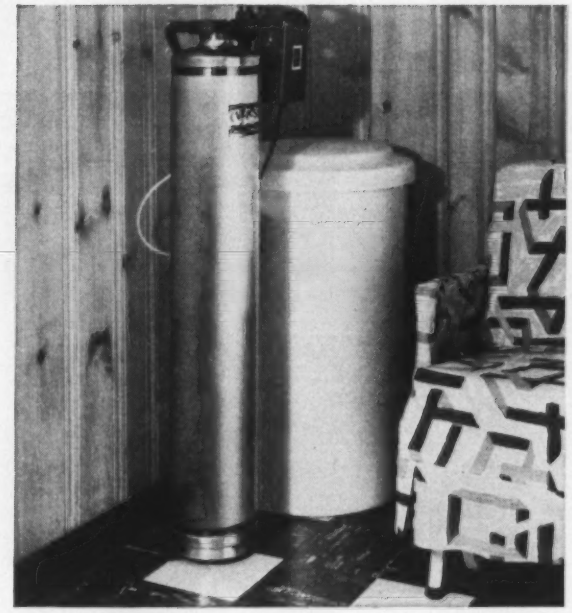
In industrial applications, Stainless Steel resists the corrosive effects of strong acids, so equipment lasts much longer, eliminating premature shutdowns. Stainless is strong, too, so it can be used in critical applications without fear of breakdown. In the chemical industry, Stainless is widely used because it is so easy to clean and does not become contaminated. These same advantages make Stainless ideal for the drug industry (where absolute sanitation is a must) and even for hospital operating rooms (which are almost all Stainless these days).

Stainless Steel can give a product the competitive edge. Its worth to you is far greater than its additional cost because of its excellent corrosion resistance, strength, appearance and superior heat resisting properties. Design quality and long life into your product—design with Stainless Steel. We welcome a chance to work with you when you are planning new products made from Stainless Steel. For more information write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS is a registered trademark.



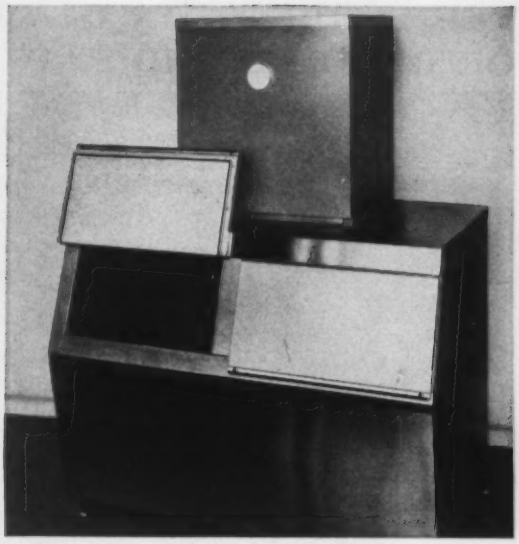
No Stainless Steel tanker has ever worn out.

The tankers here are fabricated from type 304 Stainless Steel, and can carry a variety of acids and chemicals with only a clean-out between trips. No worries about cargo contamination or corrosion, even from many harsh acids. And because Stainless cleans more quickly, the tankers are loaded for the return trip sooner . . . another marketing edge because of Stainless. No Stainless Steel tanker has ever worn out. Tank trailers manufactured by the Tank Division of The Heil Company of Milwaukee, Wisconsin.



How to soften water with Stainless.

This Stainless Steel water softener will last. It is corrosion-proof inside and out. Stainless Steel resists the strong corrosive action of the brine used in the softening process so maintenance is sharply reduced and the tank will last longer. You can install it in your cellar game room and you won't have to worry about appearance because an occasional wipe with a damp cloth will keep it clean and shiny—always. Water softener is manufactured by General Ionics Division of Salem-Brosius, Inc., Carnegie, Pennsylvania.



Keep cool with Stainless.

Ice cube bins provide their owners with an assured inventory to meet unpredictable demands. The service of providing ice cubes to the public is full of peaks and valleys of requests. Bins made of Stainless Steel can meet all these situations with steady performance. Inside, they will always be sanitary because they won't corrode and even the harshest cleaning agents won't harm the surface. Outside, their shiny appearance will always stay shiny for the same reasons. Bonus: because Stainless is so strong, it resists the bumps and thumps of hard usage, doesn't dent or "dimple." Ice chest is manufactured by the Roy Follett Corporation of Phillipsburg, New Jersey.

Stainless Steel switch lamps cost the same as cast.

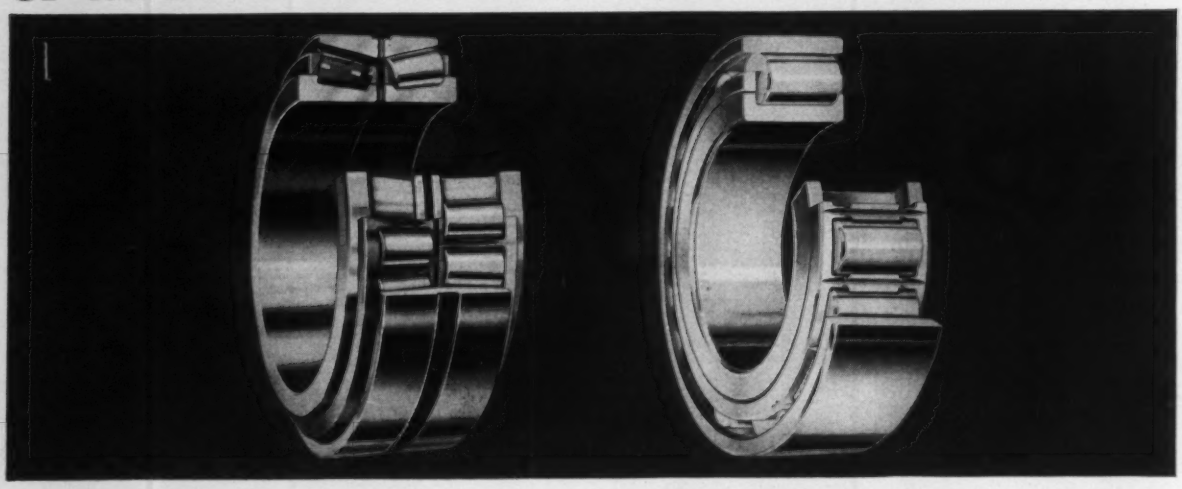
The housing for this railroad switch lamp is all Stainless. It stands out in the weather all year 'round. Many of these lamps have been in continuous service for five years without one sign of corrosion. This lamp is lighter than cast units, yet costs no more. For interior maintenance, the hinged top opens instead of swinging the entire body open as in previous cast lamps. Here dependable Stainless gives a light, first-class housing. Switch lamp manufactured by Lovell-Dressel Co., Arlington, N. J.

Why Stainless Steel is preferred in the pulp and paper industry.

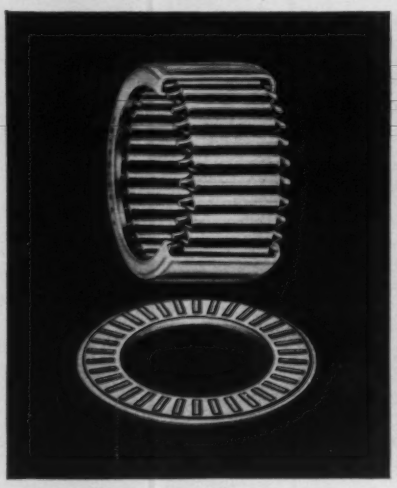
One paper manufacturer puts it this way: "Stainless is used extensively to resist corrosion from acid conditions present in many operations. One important use is for piping pulping liquors. Stainless is preferred for its low cost, cleanliness and ease of maintenance." Papermaking machines are now being built of Stainless because it is the best investment a company can make in terms of long life, corrosion resistance, ease of cleaning and reduced maintenance.

USS United States Steel

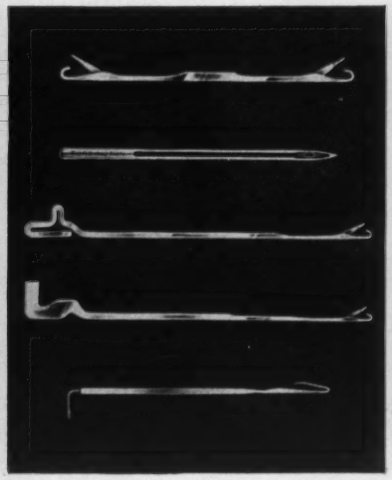
YES, TORRINGTON IS A LEADER IN THE PRODUCTION OF TAPERED AND RADIAL ROLLER BEARINGS...



BUT THIS, TOO, IS TORRINGTON...



Pioneer maker of the revolutionary needle bearing and needle thrust bearing, widely used in a variety of products including jets, missiles and rockets where space is at a premium.



Since 1866 America's largest producer of precision-made machine needles for every need—knitting, sewing, tufting, felting—and a leading manufacturer of surgeons needles.

World's largest manufacturer of rotary swaging machines for fast, economical chipless machining in the production of metal parts for thousands of uses throughout industry.

In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

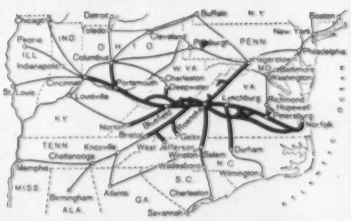
Serving industry from plants located in the United States, Canada, England, Germany and Italy

Save $283,700 a year in the manufacture of metal office furniture

In its detailed study of N&W territory, Fantus Area Research pinpointed ideal sites for the manufacture of metal office furniture. Estimated operating costs at these sites were compared with actual operating costs of similar plants elsewhere. At the N&W sites a metal office furniture plant can save up to $283,700 a year. For complete figures, write on company letterhead to H. P. Cotton, Assistant Vice President, Norfolk & Western Railway, Roanoke, Va.

Many Other Types of Plants can cut costs in N&W territory. Write and see if your company is among them.

N&W

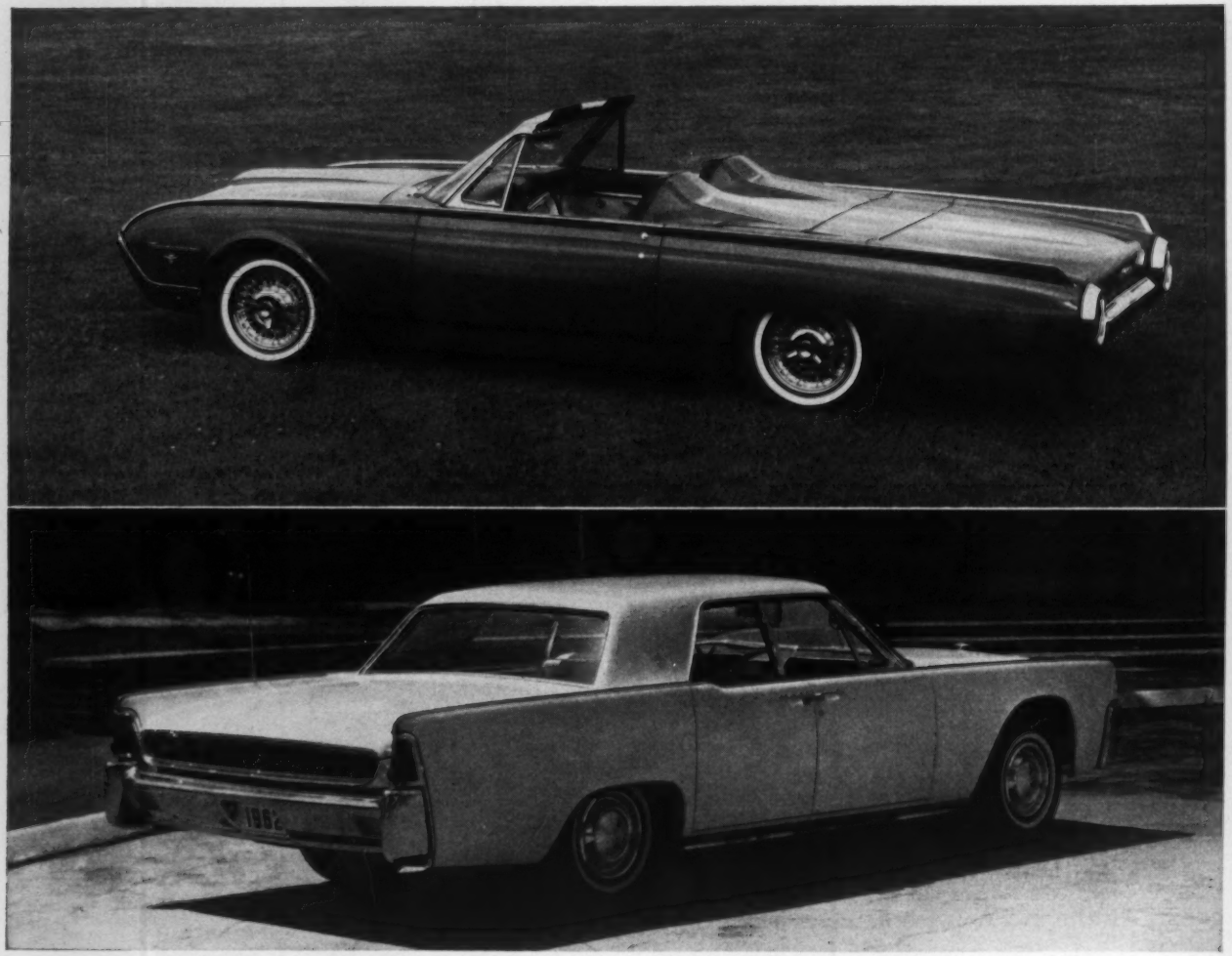


NORFOLK and WESTERN RAILWAY

Nation's Going-est Railroad

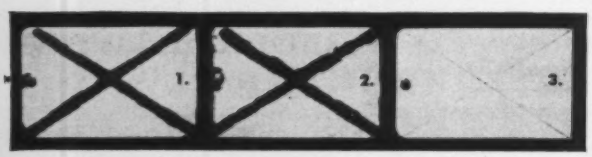
Take a lead from the leaders . . .

Amchem GRANODINE* Phosphate Protection in Depth for Lincoln



Ford Motor Company's luxurious Lincoln Continental and fabulous Thunderbird have established new heights of fine car performance while creating "classic" standards in motor car design.

GRANODINE—The obvious difference in pre-paint treatments



1. Solvent-cleaned—panels failed after 100 hours of accelerated testing.
2. Alkali-cleaned—panels failed after 100 hours of accelerated testing.
3. Granodine-treated—panels excellent after 336 hours of accelerated testing.

Coatings Provide Pre-Paint Continentals and "T-Birds"

Phosphatizing process key to producing rust-proof bodies, long lasting, quality paint finishes

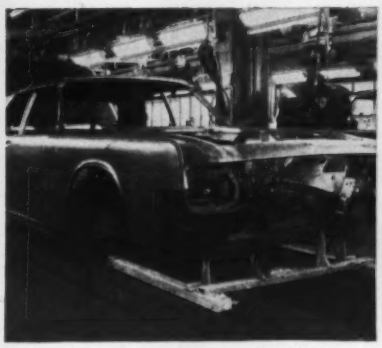
At Ford Motor Company's Lincoln Continental and Thunderbird production plant quality manufacture is the by-word as experienced craftsmen turn out the last word in automotive style and performance.

High among the many quality operations incorporated into these fine cars is the special attention lavished on the pre-paint chemical treatment of bodies and other steel and galvanized automotive parts.

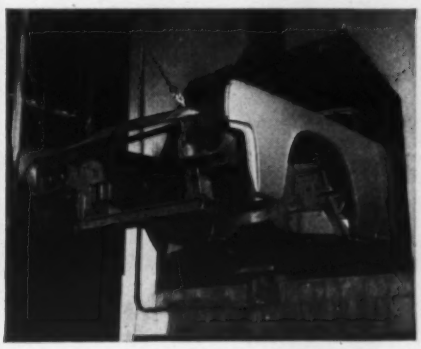
Utilizing the production-proven advantages of Granodine zinc phosphate coatings, this world-renowned automobile producer is providing potential buyers with the ultimate in quality body work, the result of Granodine's greatly improved corrosion resistance and bonding qualities combined with an already highly efficient baked enamel paint system.

Since 1933 Granodine has been demonstrating its dependability in industrial pre-paint operations. Amchem's experience and technical know-how in metal protection techniques assure you that Granodine will meet present day high volume production schedules with minimum maintenance and operator attention. Call your local Amchem Representative for complete details.

*Amchem's registered trademark for its conversion coating chemical used to produce phosphate coatings on steel.



Body in white in metal finishing area prior to phosphating.



Granodine-treated body at exit end of phosphate washer.

Phosphatized body is seen in final paint line.

AMCHEM **GRANODINE**

Amchem is a registered trademark of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.)
AMBLER, PA. • Detroit, Mich. • St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.

Illustrated above are only a few of the many different sections in the standard range held. In point of fact, almost any practicable shape can be supplied on request.

THOS. W. WARD LTD

Write to Overseas Trade Dept. I. A.
HEAD OFFICE: ALBION WORKS, SHEFFIELD, ENGLAND
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Have you received your current copy of The Albion Machinery Catalogue? If not, write for one today. This catalogue contains a comprehensive stock list of all new and secondhand Plant and Machinery, including Machine Tools, Generating Sets and Pumps. It is regularly brought completely up to date and reprinted.

What in blazes can't B.F. Goodrich hose stand

How an improved kind of hose keeps furnace doors from melting

IT'S 3000 degrees hot inside those open hearth furnaces. So hot that the heavy steel doors would melt in minutes except for the hose that carries a stream of cooling water in and out of them.

Trouble was that the hose used to burn out after only 2 or 3 weeks. White hot blasts of heat cook it. Hot metal spatters it. Often big "charging machines" bang into it.

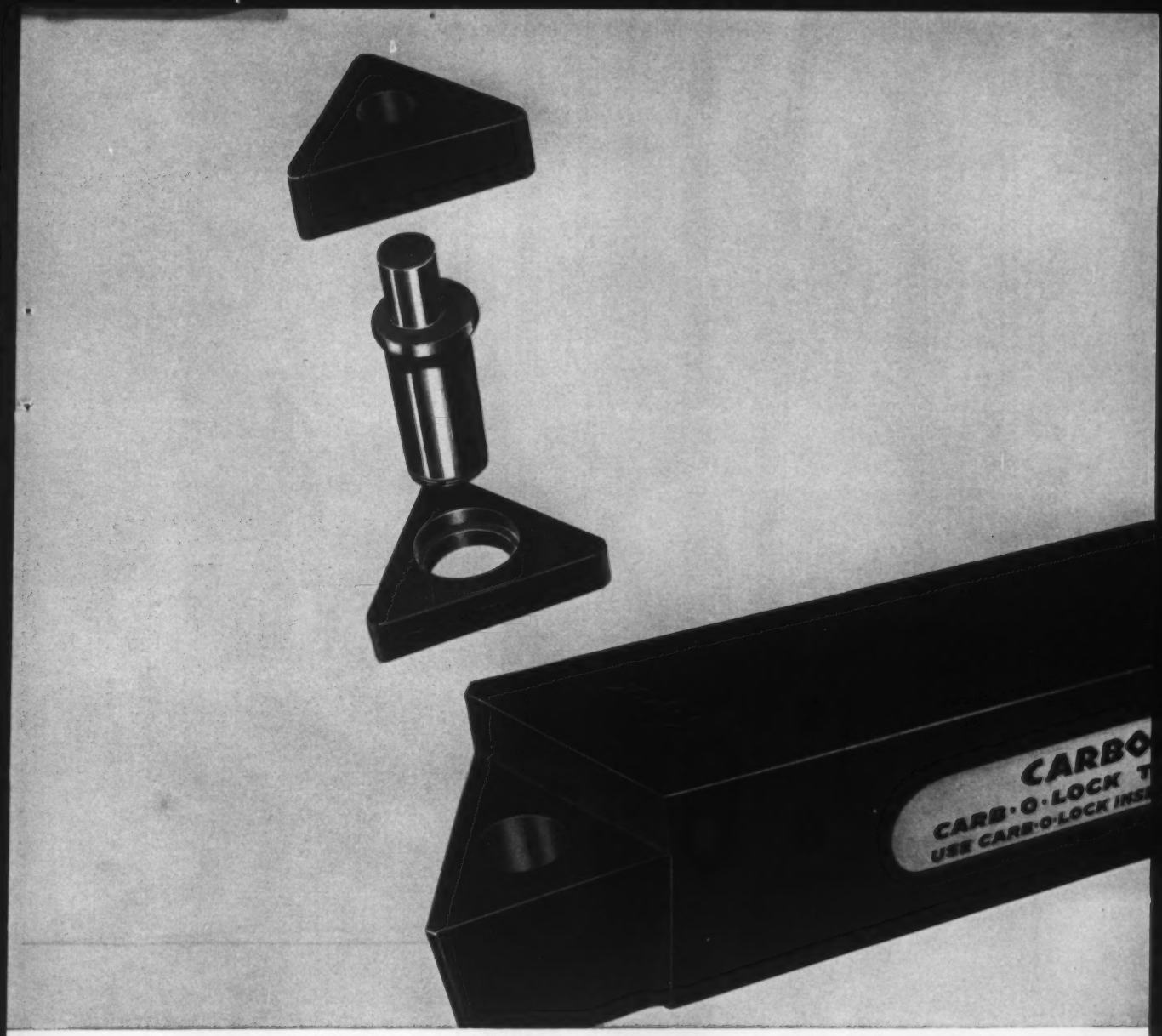
The B.F.Goodrich distributor, servicing the steel mill, asked what we could do to solve this problem. BFG engineers designed, tested, rejected—finally developed a rubber hose, wrapped with asbestos for heat resistance, armored with braided stainless steel wire for strength.

Where other more expensive hose burned out in a matter of a few weeks, the B.F.Goodrich hose is good for *3 or 4 months* of constant use. What's more, the improved BFG hose is much lighter, more flexible, easier for workmen to handle. One man can install it where two were needed for other hose.

B.F.Goodrich makes hose to carry almost anything—from blasts of air to torrents of water; for scalding steam, corrosive chemicals, abrasive sand. Any one of our BFG distributors can explain the different types of hose we make, tell you what to expect from each, help you decide which is your best buy. *B.F.Goodrich Industrial Products Co., Dept. M-161, Akron 18, Ohio.*

B.F.Goodrich

How to cut your disposable-tooling costs by 30 per cent at no sacrifice in quality or output. (Answer is on the next page.)



With the new Carb-O-Lock toolholder-insert combination. The single most important advance in the whole history of metal-cutting.

Save 30 per cent when you buy it. Save 40 per cent when you use it.

These are minimums. Users of the Carboloy Carb-O-Lock toolholder-insert combination have reported savings many times higher. Why?

Simple. The Carb-O-Lock design is simple. Using a cam-action locking principle, the Carb-O-Lock has just three parts (not including insert). Insert changing and indexing is a breeze; parts inventories can be held to absolute minimums. Streamlined design lets you bring the toolholder closer to your work. And less overhang means less vibration, less insert chipping and breaking.

Plus: the Carb-O-Lock gives you proven performance. A major diesel engine manufacturer discovered Carb-O-Lock allowed nearly triple the feed, eliminating two machines. A locomotive and car equipment company found Carb-O-Lock's simple, rugged design reduced time for tool changes and permitted maximum horsepower utilization.*

Carb-O-Lock inserts are available now in Grade 883 for machining cast iron, as well as many operations on the following materials: high-temperature alloys, type 300 stainless steel, brass, bronze.

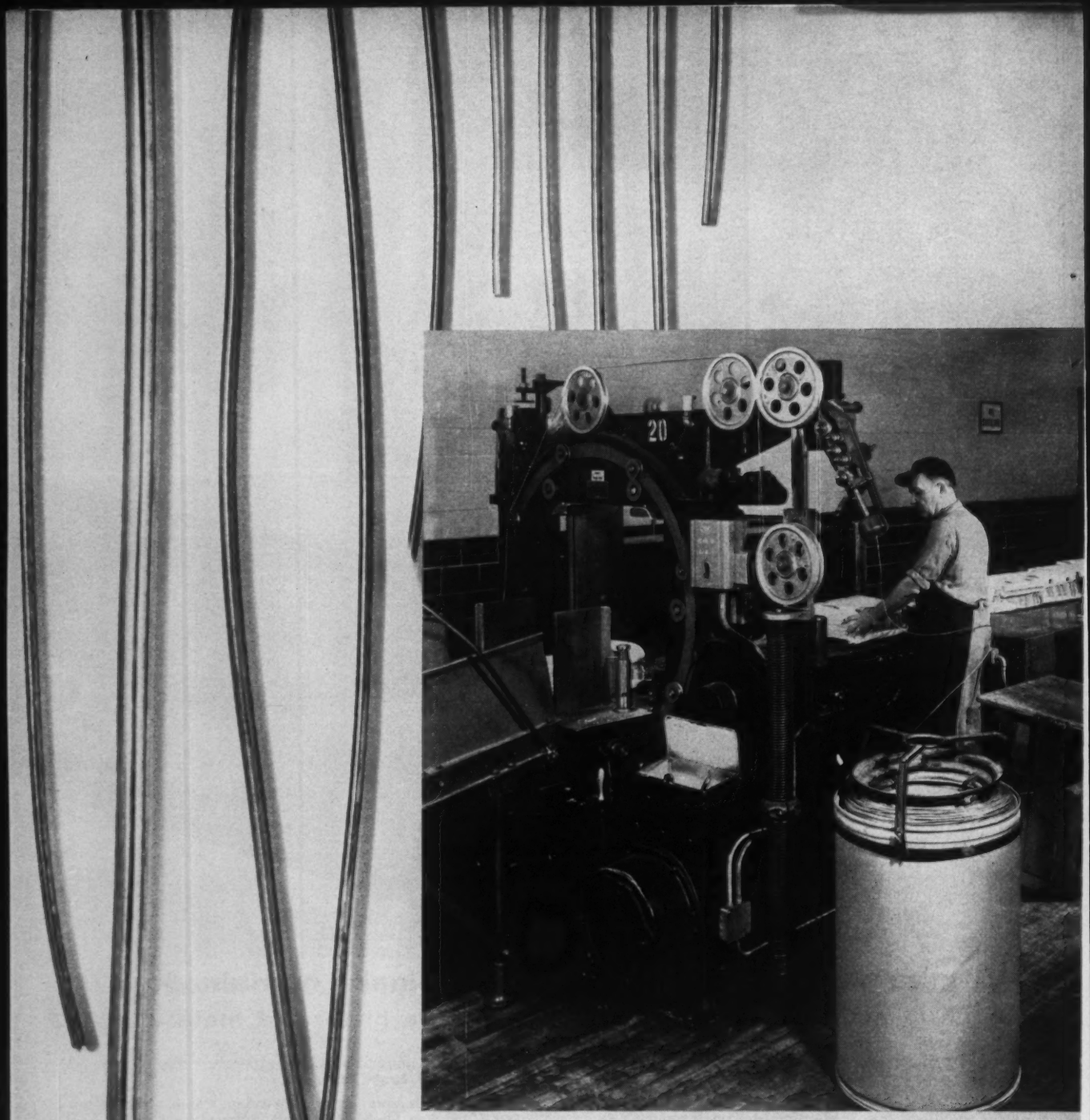
So start your savings program today. Phone your Authorized Carboloy Distributor and order your Carb-O-Lock toolholder-insert combination. Save 30 per cent. And more.

Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Road, Detroit 32, Michigan.

**Case histories available on request*

CARBOLOY
CEMENTED CARBIDES
METALLURGICAL PRODUCTS DEPARTMENT
GENERAL ELECTRIC

CARBOLOY CEMENTED CARBIDE BLANKS AND DISPOSABLE INSERTS • BRAZED TOOLS • TOOLHOLDERS • CARBIDE DIES • WEAR PARTS



"Next to paper and ink, tying wire is our most important purchase," says Chicago *TRIBUNE* management . . . clear proof that the *TRIBUNE's* use of Republic Wire for automatic bundling of newspapers is based on preference and specification. Wire used is soft galvanized, tough, yet easy forming—perfectly suited to fast handling in this publisher's automatic wire tying machines.

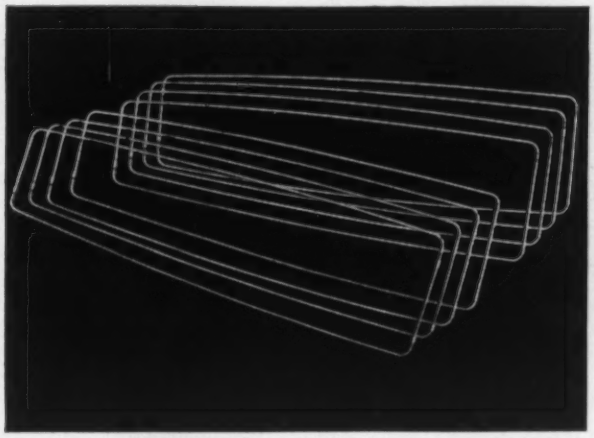
Steel

Strong
Modern
Dependable

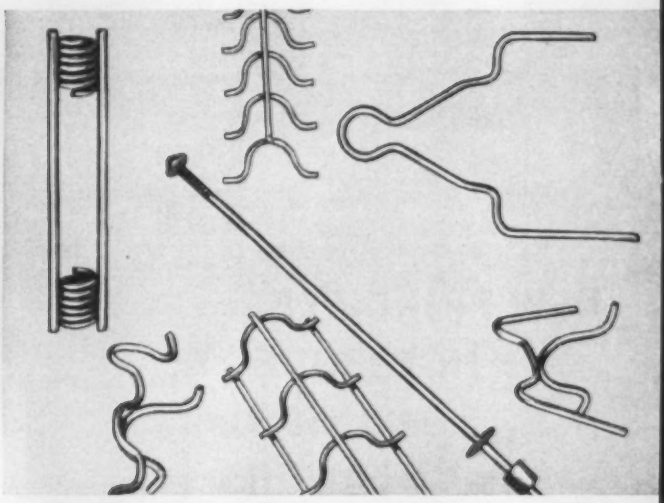
WIRE? WRITE, OR PHONE REPUBLIC

Republic has a reputation for solving wire worries. Rely on it. Talk to a Republic Wire Metallurgist—a man who knows and *understands* industry's varying needs for tensile, elongation, flow and formability. His experience, much of it gained by working on the scene with manufacturers like yourself, is backed by skill at the manufacturing level, plus undivided quality responsibility. Adherence to your specifications is under full Republic control, from ore selection to your plant . . . assuring that the wire you get will consistently meet your specific requirements.

Republic Wire Metallurgists can be called in at any time, on any problem of wire selection, application, or processing . . . *without obligation.* Wire? Write or call Republic, now.



B-W MANUFACTURERS, INC., former choice of wire for these popular trouser creasers lost its galvanized coating when flattened and bent to form the four right angles. Republic Wire Metallurgists recommended Republic *Electro-Galvanized* Wire. Result—profitable, perfect production ever since. Electro-Galvanizing electrically deposits pure zinc particles on the wire in deep uniform layers—permanently bonded and *tough*—yet pliable enough to permit tying the wire in knots without cracking the zinc coating!



MEADOW STEEL PRODUCTS, INC., keeps prices competitive on masonry construction accessories with adaptable Republic Manufacturers' Wire. More than 20 different parts are made from only a few types of wire, lowering inventory and material costs, and greatly simplifying production.

REPUBLIC STEEL

REPUBLIC HAS THE FEEL FOR MODERN STEEL

REPUBLIC STEEL CORPORATION
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Please send information on the following kinds of Republic Wire:

- ☐ Manufacturers' Coarse Wire
- ☐ Spring Wire
- ☐ Screw Wire
- ☐ Rivet Wire
- ☐ Heading Wire
- ☐ Have a Republic Wire Metallurgist call

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Company_____

Address_____

City_____ Zone____ State____

NEW PRINCIPLE IN TORQUE CONTROL LOWERS ASSEMBLY COSTS

Rotor announces J-42T torque control air impact wrench with new hydraulic amplifier

- **NEW** unique hydraulic amplifier shuts off tool at desired torque. This exclusive device results in...
- **FASTER** rundown and impacting speed. Cuts job time.
- **MORE ACCURATE** torque control with uniform results. Quick, easy adjustment...tamperproof.
- **ASK FOR DEMONSTRATION** of the J-42T to see how this outstanding development can cut costs on your assembly line.

Write The Rotor Tool Company, 26300 Lakeland Blvd., Cleveland 32, Ohio.

Here's the RIGHT TOOL for YOUR job!

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SUBSIDIARY OF THE COOPER BESSEMER CORPORATION

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The consistently high quality soda ash and dependable service provided by the West End Division to western industry for over 36 years from its California plant will be offered in a greatly expanded area on completion of the new Stauffer plant in Wyoming at the site of vast, natural soda ash deposits. Let us suggest practical ways bulk or bagged soda ash can be supplied economically from Stauffer's multiple source to your point of consumption. Simply address the coupon below and mail.

Stauffer CHEMICALS

WE ARE INTERESTED IN KNOWING THE BENEFITS TO US OF STAUFFER AS A SODA ASH SUPPLIER.

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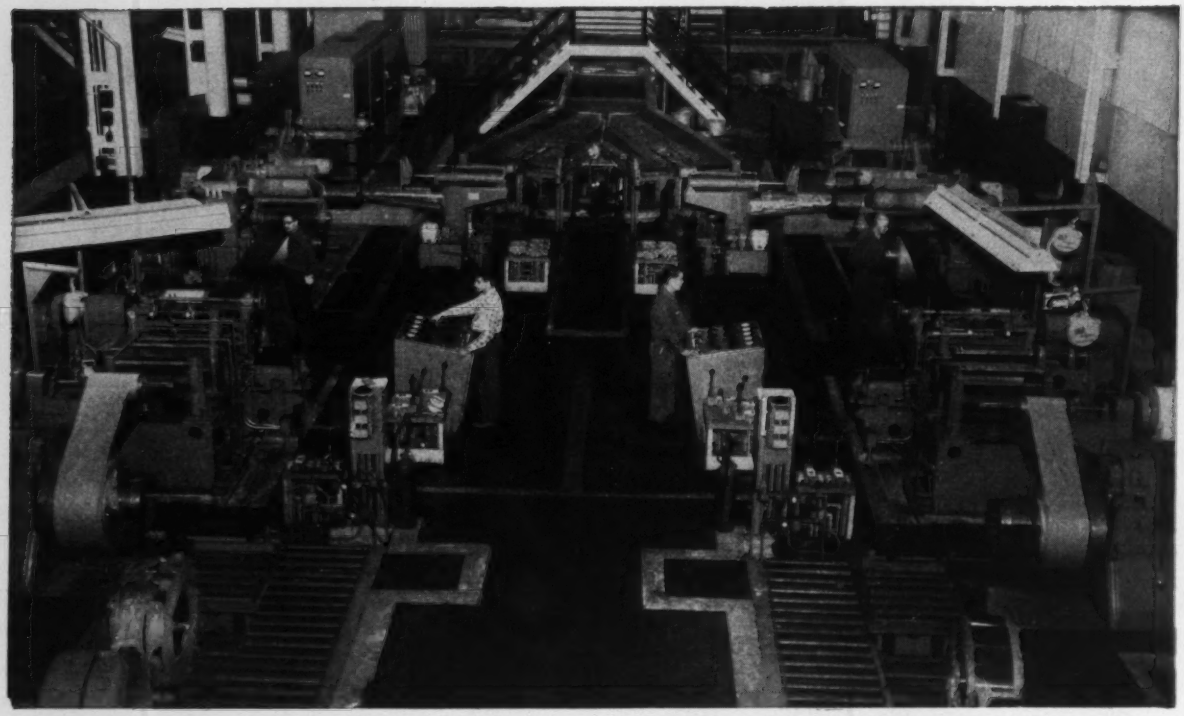
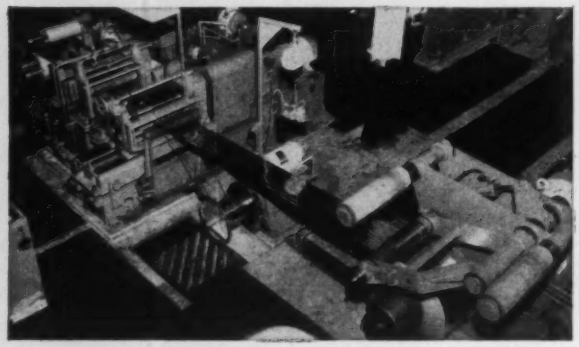
Please mail to West End Chemical Co., 636 California Street, San Francisco, Calif.

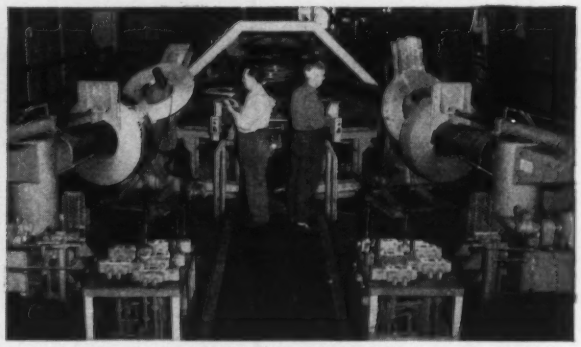
WEST END CHEMICAL COMPANY • DIVISION OF STAUFFER CHEMICAL COMPANY

SAN FRANCISCO, 636 CALIFORNIA STREET • CHICAGO, PRUDENTIAL PLAZA • ST. LOUIS 19, P. O. BOX 48



Predictable Performance...





SECO Slitting Installation, Superior Steel Division, Copperweld Steel Company, Carnegie, Pa.

is automatic—start to finish—with a SECO *Slitting Line*

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

Every operation in this *complete* slitting line by SECO—from entry to exit of coils—is fully automated. It was specifically designed and built by SECO to meet the maximum performance requirements of the Superior Steel Division, Copperweld Steel Company, Carnegie, Pennsylvania.

SECO's staff of experienced sales engineers, specialists in production problem solving, are prepared to show you how you can get "predictable performance" in *your* operation—whatever your requirements. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles, California.

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

Let Disston solve your replaceable metal parts problems

Disston's Custom Metal Parts and Services offer: ■ modern facilities ■ over a century of skilled craftsmanship ■ a thorough knowledge of steel and its applications ■ a reputation for *uncompromising quality*.

Disston is ready to serve you, whether you require a single service or a complete product manufactured to your exact specifications. May we help you? Consult Disston first serving industry since 1840. Disston, Porter Building, Pittsburgh 19, Pennsylvania.

Send for this free booklet, "Disston Custom Steel Parts and Service," which describes Disston's wide range of manufacturing capabilities.

Disston Division, H. K. Porter Company, Inc.
Porter Building, Pittsburgh 19, Pa.

Dear Sirs: Please:

☐ Send free booklet "Disston Custom Steel Parts and Service"

☐ Have representative call

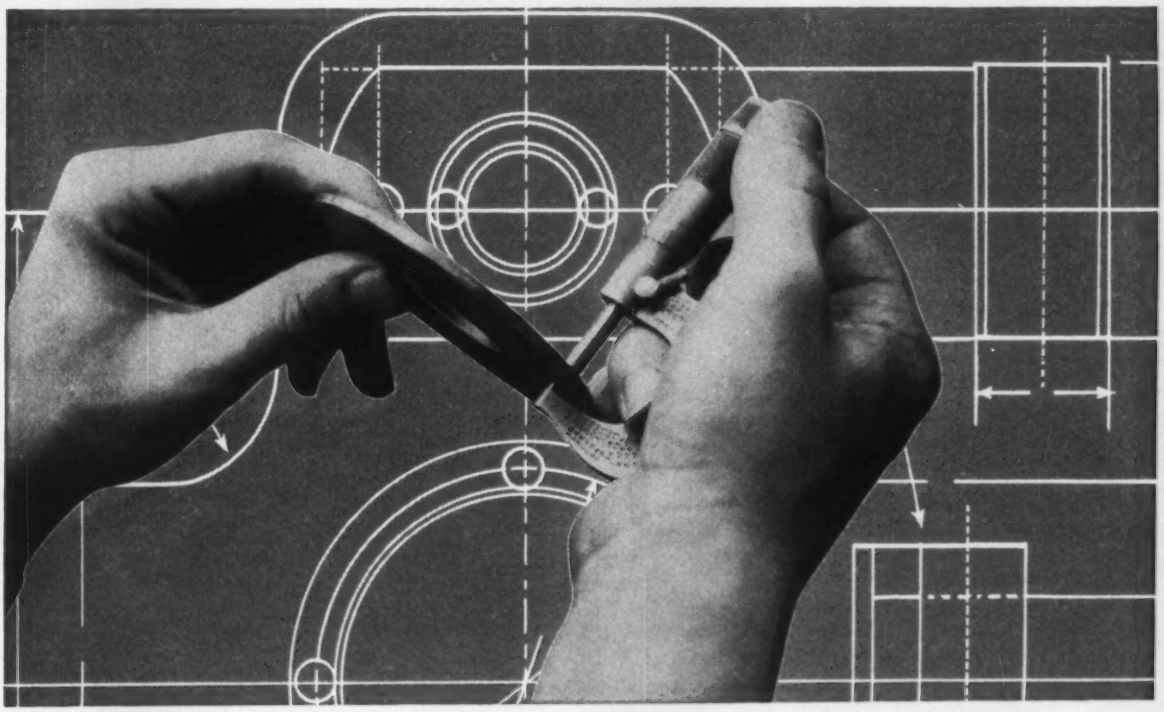
Name_____

Title_____

Company_____

Street_____

City_____ State_____



PORTER **DISSTON DIVISION**
H. K. PORTER COMPANY, INC.

These sound castings made sound products

Gray and alloyed iron castings are continually being called upon to do more exacting jobs. Parts are now designed and cast to meet strength and weight standards precisely. Over-design or "rule-of-thumb" casting procedures mean penalties in weight, size or cost. Under-design or casual production controls reduce quality and dependability of the end product.

These castings were engineered to specifications at The Decatur Casting Company where high quality standards govern every step of the production process. Heat treating, when required, was done in our own furnace. The customers ordered castings to specification—and got what they ordered in every casting.

Decatur Quality Castings® are supplied in weights from a few ounces to 100 pounds. We suggest you consult us on your next casting requirements.

THE DECATUR CASTING CO.

Light Gray Iron and Alloyed Iron Castings
Decatur, Indiana Phone: Decatur 3-2700

1. Efficient. An important addition to Simonds line of quality cutting tools, Simonds new Hole Saws saw holes cleanly and efficiently in machinable materials up to 1⅛″ thick. Ideal for portable tools, drill presses, lathes, boring mills, and milling machines . . . Simonds floating pin-drive arbor assures positive non-slip cutting.

2. Shatterproof. Made with a special wear-resistant high speed steel cutting edge, these saws *stay sharp* for exceptionally long periods. Rugged. Tough. Simonds cutting edge is permanently bonded to a tough alloy steel body for maximum strength and resiliency . . . makes these the sturdiest hole saws you can buy.

3. Easy-Out. Simonds knock-out slots allow easy removal of cores. "Follow through" design of cap permits sawing deep holes in stacked or layers of material where cores can be removed. Now available from your nearby Simonds Distributor for hole sizes from 9/16″ to 6″ diameter. 6 mandrel sizes offered for light to heavy cutting. Call and try some today. Discover how "Simonds means savings whatever you cut."

INDUSTRIAL DISTRIBUTORS · THE RIGHT HAND OF PRODUCTION

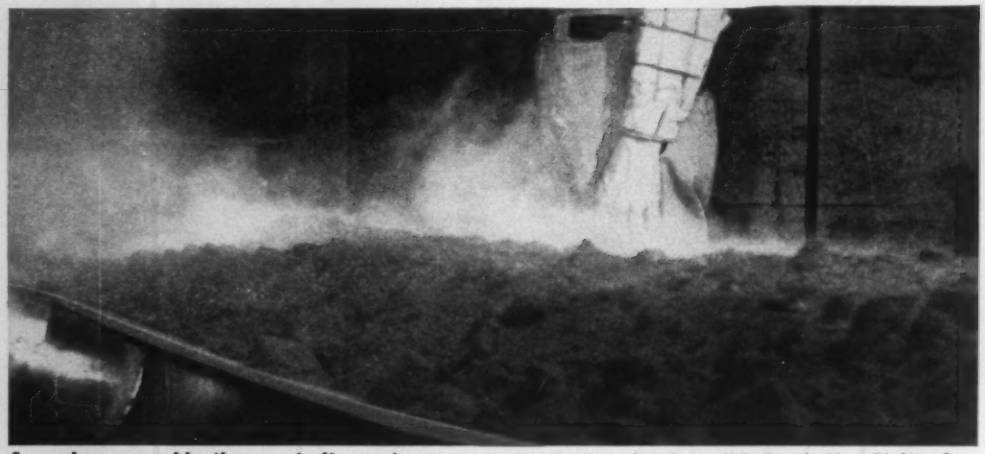
SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASSACHUSETTS

Buy through your local Simonds Distributor for — Local Stocks — Local Speed — Local Skill

Factory Branches in Union, N. J., Chicago, Shreveport, La., Los Angeles, San Francisco, Portland, Ore. • Canadian Factory in Granby, Que. • Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.; Heller Tool Co., Newcomerstown, Ohio; Simonds Abrasive Co., Philadelphia, Pa. and Arvida, Que., Can.

US RUBBER

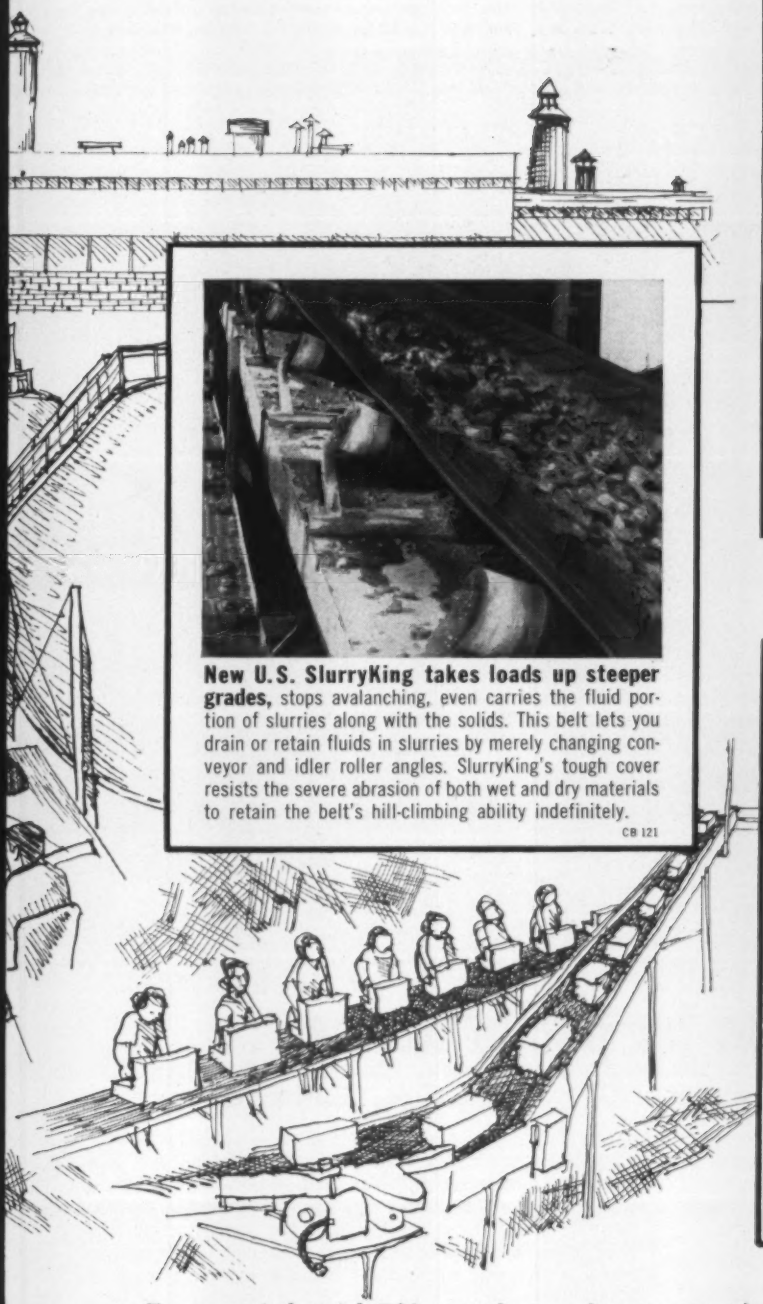
AT THE HEART OF INDUSTRY...



A murderous combination meets its master in this leading Southern foundry as U.S. FoundryGiant RipStop Conveyor Belts withstand hot foundry sand loaded with jagged pieces of cherry-red tramp iron... last 8 times longer than other belts. Special internal wire ribs prevent jagged pieces of metal flash, sprues, gates, and other abrasive material from tearing and wrecking the belt.

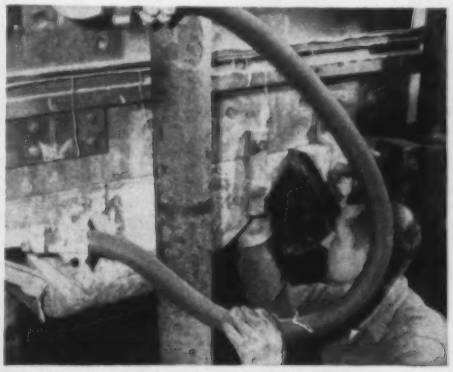
CB 114

Wherever industry needs "muscle" for the job, it calls on US. U.S. Rubber products make jobs easier, more efficient, more profitable for manufacturer and operator alike. By understanding and meeting the needs of industry, US has become the world's largest producer of industrial rubber products.



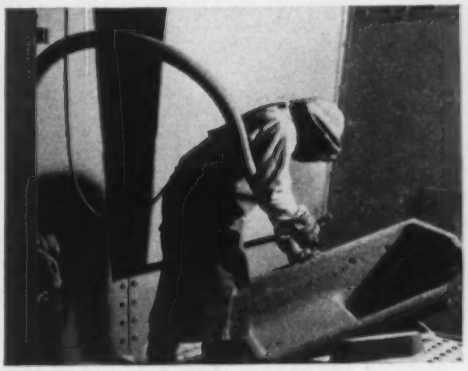
New U.S. SlurryKing takes loads up steeper grades, stops avalanching, even carries the fluid portion of slurries along with the solids. This belt lets you drain or retain fluids in slurries by merely changing conveyor and idler roller angles. SlurryKing's tough cover resists the severe abrasion of both wet and dry materials to retain the belt's hill-climbing ability indefinitely.

CB 121



Live steam, inches away — yet this man's safe, next to the hose that death-causing steam cannot burst. U. S. Matchless® Steam Hose has its own built-in safety device. When it's ready for replacement, the wire-braid construction prevents it from bursting. Instead, just a wisp of steam seeps through, letting you know it's time for a new hose.

H 109



In the tough jobs like this one, U. S. Rainbow® Sandblast Hose demonstrates its exceptional qualities. Carrying sand or steel shot after other hoses have failed, this hose provides safety as well as long wear. Its durable rubber tube is especially treated with a highly conductive material to dissipate static electricity, and its strong carcass flexes easily to prevent kinking.

H 122

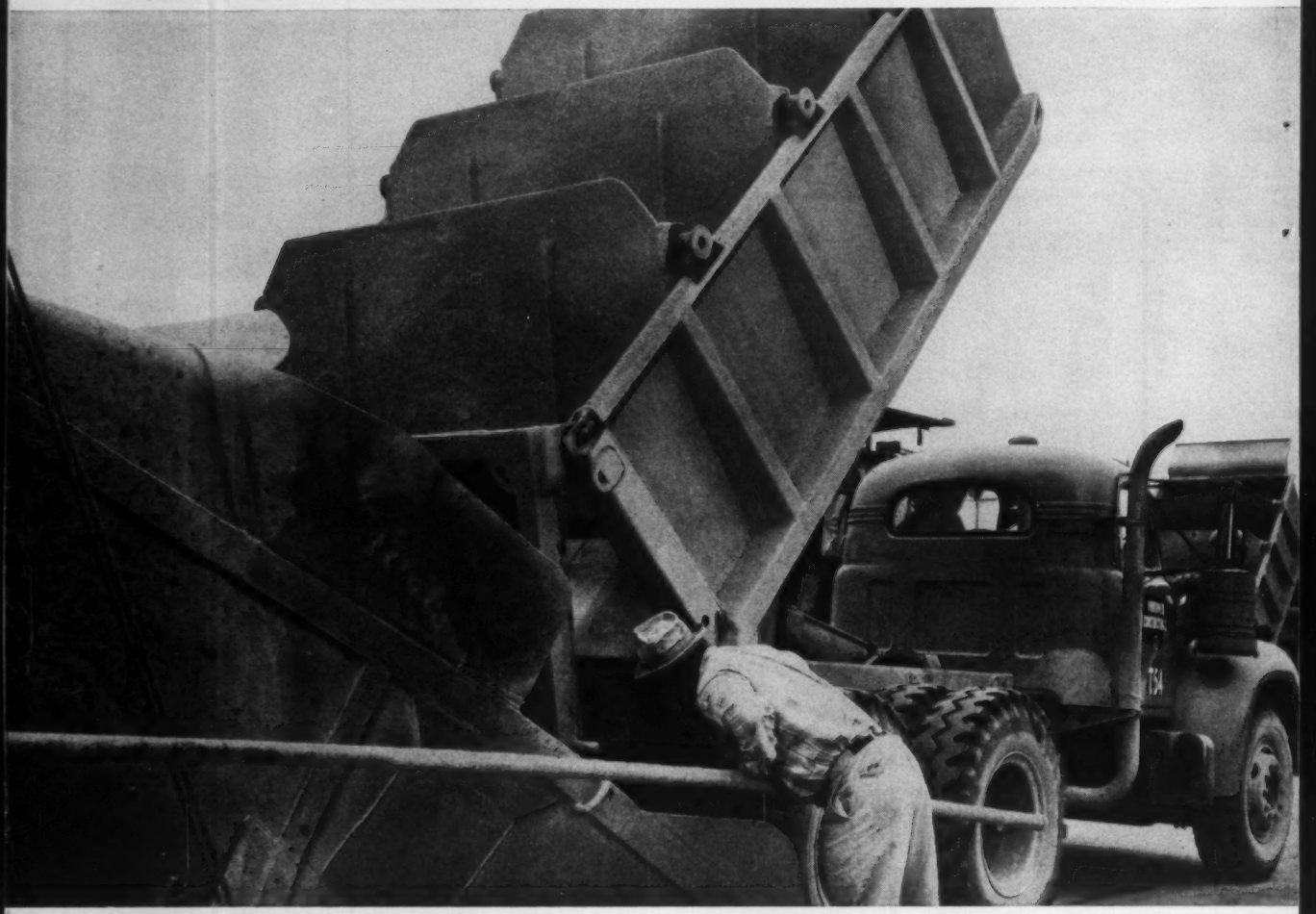
For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER
OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber
MECHANICAL GOODS DIVISION

Now you can get USS "T-1" Steels from Steel Service Centers coast to coast

All the dry mix leaves the box because of the smooth, dent-free surface of USS "T-1" Steel bottom plates. Extra clean-out men are not needed. Understructure, sides, batch and tail gates are USS COR-TEN Steel for strength and light weight. Truck Body Fabricator: Capital Industries, Inc., Seattle, Washington.



The best combination for performance . . .

Dump truck bodies made of USS "T-1" and COR-TEN Steels

"Pouring 4,100 feet of concrete highway is a good day's work," says Louis Tomaso, pouring superintendent for Northwest Construction Company, Seattle, Washington. "This kind of production takes the best equipment. That's why we are sold on dump boxes made with U. S. Steel's 'T-1' and COR-TEN Steels."

"With 'T-1' Steel in the bottoms and COR-TEN Steel in the sides and gates, we get a clean dump every time," says Mr. Tomaso. "The surface remains smooth and dent-free. None of the mix hangs up in the truck."

Northwest's trucks also double as earth movers and here's where they meet their real test. The maintenance superintendent, Homer Baer, says, "USS 'T-1' Steel is tough enough to take the impact of heavy rocks falling from the shovel and the 3/16-inch bottom plates have never ruptured, stretched or dented."

Less weight—more payload. The combination of USS "T-1" Constructional Alloy Steel and COR-TEN High Strength Steel cuts 1,020 pounds of dead weight from the trucks and allows bigger payloads. USS "T-1" Steel and the new lower priced "T-1" type A Steel can be furnished to a minimum yield strength of 100,000 psi, or a minimum hardness of 321 Brinell, depending on application. USS "T-1" Steel can also be furnished to 360 Brinell. All of these tough, weldable steels can reduce weight and increase the strength and life of your equipment. Call your local Steel Service Center for more information. Or, for the name of the distributor of USS "T-1" Steels nearest you, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal and Iron Division • United States Steel Export Company

USS United States Steel

WE'RE PUTTING OUR MONEY WHERE OUR MOUTH IS!

WITH A 90-DAY MONEY-BACK GUARANTEE ON THE NEW PRATT & WHITNEY TAPE-O-MATIC DRILL

$8,595

1½ HP. Big 30" x 20" table.
Simultaneous positioning of both axes.
(3 HP. optional at extra cost.)

NOW! FOR THE FIRST TIME A NUMERICALLY CONTROLLED DRILL FOR ONLY $8,595 GUARANTEED TO REDUCE YOUR DRILLING COSTS

At last . . . a drill with the finest, transistorized, numerical-control system available for only $8,595 . . . because P&W brings mass production to the machine tool industry for the first time . . . yet maintains the 100-year tradition of P&W quality.

The TAPE-O-MATIC enables **you** to benefit from numerical control . . . to gain a vitally-needed, important competitive edge.

WE BELIEVE IN THIS NEW DRILL SO STRONGLY THAT WE OFFER:

1 90-DAY, MONEY-BACK GUARANTEE. If by 90 days after purchase, this drill has not reduced your drilling costs, return it for refund, less transportation costs.

2 5-YEAR WARRANTY. We fully warrant the TAPE-O-MATIC drill against defective parts and workmanship for 5 years from date of purchase.

3 UNIQUE TERMS. You can buy TAPE-O-MATIC using our exclusive Trade-in Plan. You can purchase the drill outright, lease it, or lease it with option to buy. ONE PER CENT CASH DISCOUNT FOR PAYMENT IN 10 DAYS.

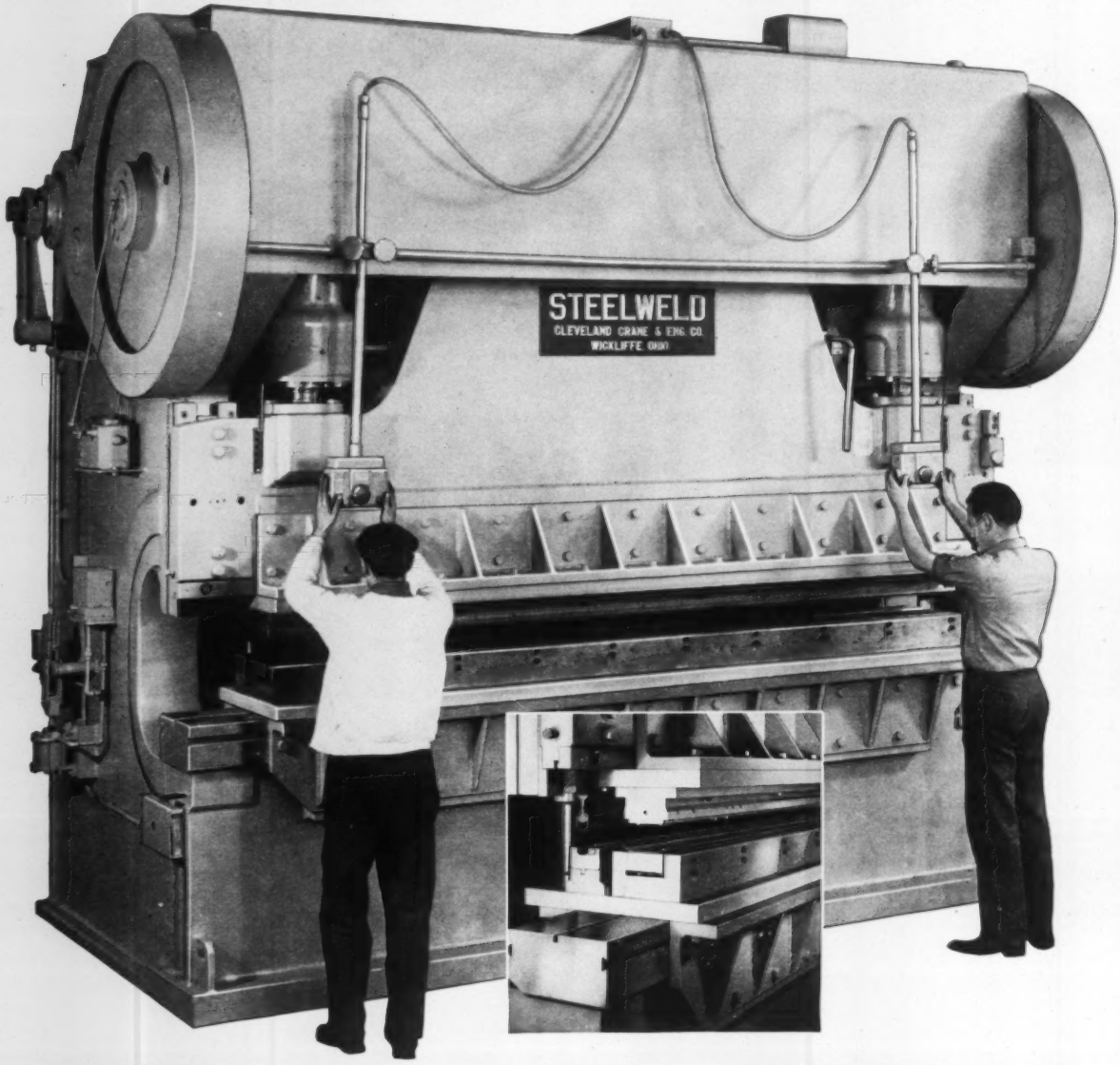
Call collect . . . your local Pratt & Whitney representative, now! Or write to: Paul N. Stanton, Vice President Marketing; Pratt & Whitney Co., Inc.; Charter Oak Blvd.; West Hartford, Conn.

PRATT & WHITNEY
A MAJOR INDUSTRIAL COMPONENT OF
FAIRBANKS WHITNEY
Machine Tools / Cutting Tools / Gages

HEADQUARTERS FOR AMERICA'S WAR AGAINST OBSOLESCENCE

STEELWELD PRESS BRAKE CUTS FORMING COSTS

Fast Two-Step Operation Speeds Trolley Duct Production



ELECTRIC trolley duct is turned out at a high rate on a Model K5-10 Steelweld Brake. The machine is fitted with removable bed and ram brackets to provide the width necessary to support two sets of dies. The front dies flange both sides of steel strips. The rear dies form the flanged strips into ducts. Thus, with each stroke of the ram, two operations are performed and a trolley duct completed. As many as 20 ducts can be produced per minute, which is the speed of the machine.

Two men normally work at the press, and each is provided with a set of control buttons. As a safety measure, two "run" buttons, requiring both hands of the two men, must be depressed to operate the machine.

This machine has air-electric control which eliminates the need of any cross shafting at front for mechanical foot treadles. Air-electric control makes push-button operation possible and provides fast, positive clutch and brake action.

Write for free copy of catalog No. 2023A

STEELWELD

Mechanical and Hydraulic

PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

THE CLEVELAND CRANE & ENGINEERING COMPANY · 4872 EAST 281st STREET · WICKLIFFE, OHIO

Grade "A" down the shipping line

Few applications demand so much from a metal as those in the dairy industry. Equipment which comes in contact with milk must be completely corrosion-resistant, easy to keep hygienically clean, and practically indestructible. For years many metals were tested and today, from milk pail to bottle-filler, virtually every piece of equipment used in the handling and processing of milk is made of stainless steel.

Product reliability like this depends on uniformity of both materials and production—the reason J&L stainless is bought regularly by dairy equipment manufacturers. J&L delivers quality consistently, order after order, to help you send Grade A products down the shipping line.

Get consistent quality stainless steel from your J&L distributor, *as* you need it, *when* you need it. He can also provide technical assistance.

Jones & Laughlin Steel Corporation

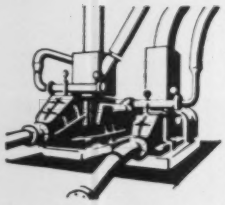
STAINLESS and STRIP DIVISION · DETROIT 34

STAINLESS

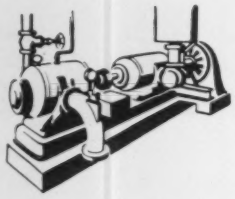
SHEET · STRIP · BAR · WIRE

FULLER EQUIPMENT

for the process industries

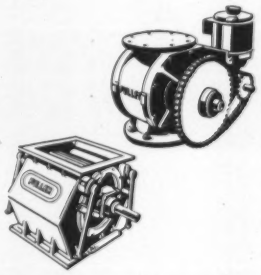


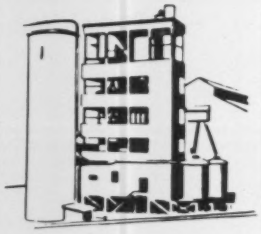
Pneumatic Materials Handling Systems. Widely specified throughout the process industries, Fuller's range of equipment offers best single source for solving problems in moving dry bulk materials pneumatically. Fuller-Kinyon Pumping Systems, Airveyor® Pressure and Vacuum Conveying Systems, and F-H Airslide® Fluidizing Conveyors are completely sealed to prevent both contamination of the product and any leakage of dust, etc., into the surrounding area. They are used to move dry, granular and pulverized materials to and from cars, ships, trailers, storage and processing points.



Fuller Rotary Compressors and Vacuum Pumps are vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Compressors and Vacuum Pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage. Vacuums to 29.95 in. (referred to 30-in. barometer).

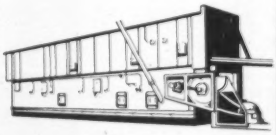
Fuller Vane-type and Roll Feeders . . . for volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Also Fuller Rotary Valves . . . used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials.





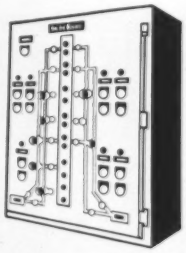
Fuller Preheaters, Humboldt Suspension Type . . . for preheating dry, pulverized Portland cement raw materials with rotary kiln waste gases.

Fuller Horizontal and Inclined Grate Coolers are compact, easily installed for fast, efficient cooling of materials such as nodulized phosphate rock, pebble lime, ores, dolomite, iron nodules and Portland cement clinker from 2800°F. or higher to any desired point within a reasonable range of atmospheric temperature.



Fuller-Material-Level Indicators signal audibly and visibly when materials reach a predetermined high or low level. Controls conveyor motors, valve circuits, etc.

Fuller Control Panels permit automatic, remote, one-man control of multiple operations. Easily-read panel permits visualizing flow of material to storage or from process bins.



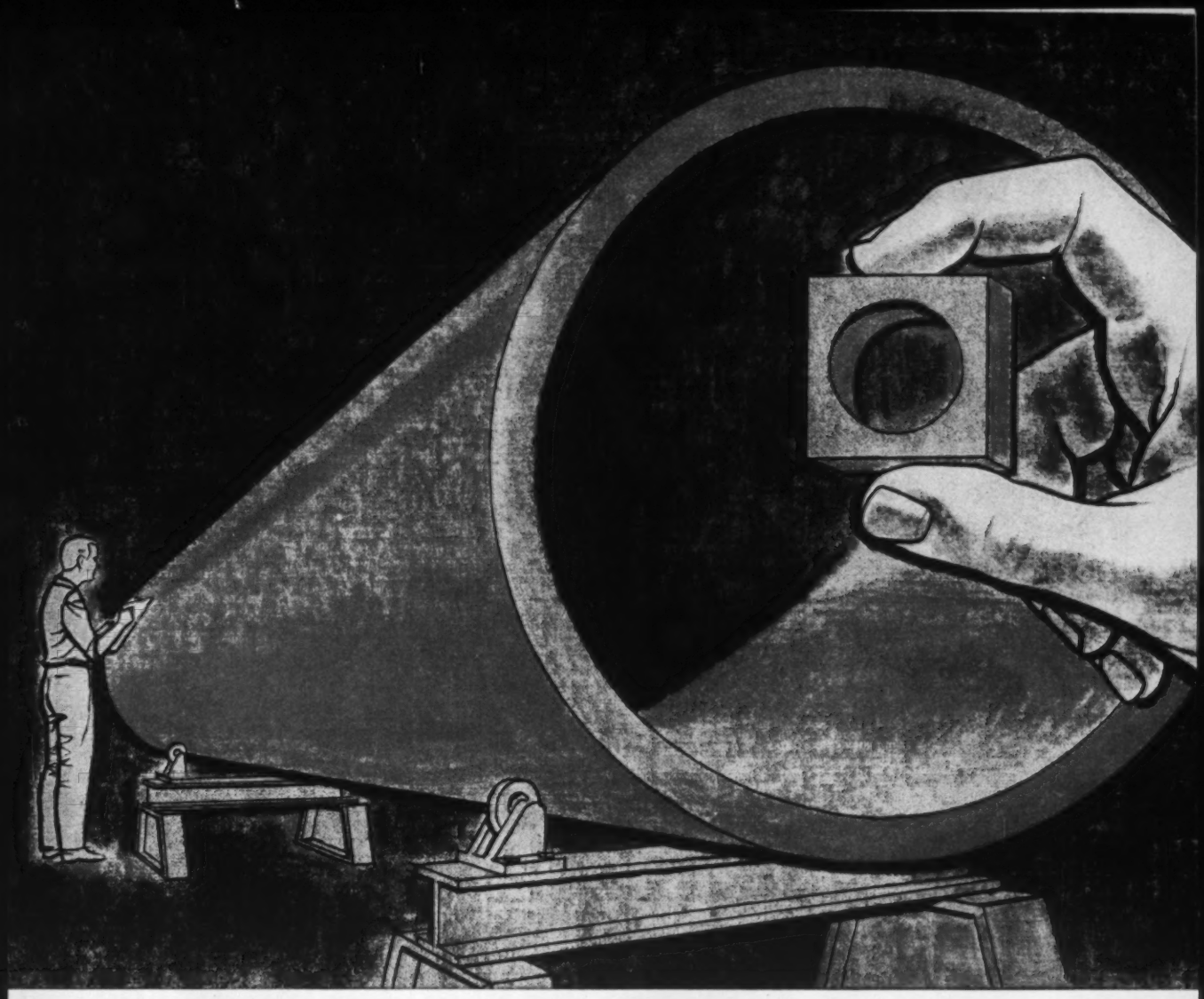
Fuller equipment is designed to help give you maximum efficiency at minimum cost. Send today for more detailed literature.

1356
G-210

FULLER COMPANY GENERAL AMERICAN TRADE MARK

FULLER COMPANY
122 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller
....pioneers in harnessing AIR



From the largest to the smallest you'll save money with Shenango Centrifugal castings

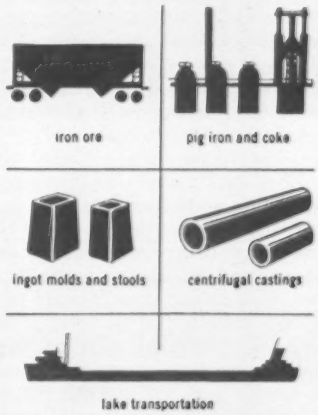
From tiny liners and bushings to the largest sleeves, rings and rolls, you'll find that ferrous or non-ferrous symmetrical parts will be cleaner, denser and more uniform if they are centrifugally cast in Shenango's modern foundry. This means you'll save money. There will be less metal wasted, less machining time, fewer rejects and longer product life than would be true with ordinary casting methods. And because Shenango operates one of the biggest and most efficient centrifugal foundries and machine shops in the country, your largest orders will be filled quickly and exactly to specification. Write for literature.

CENTRIFUGAL CASTING DIVISION

the Shenango FURNACE COMPANY

DOVER, OHIO

THIS IS SHENANGO!



Copper, Tin, Lead, Zinc Bronzes • Aluminum and Manganese Bronzes • Monel Metal • Ni-Resist • Meehanite Metal • Ductile Iron

Best rest comes from wire spring coils—hundreds of them laced together in an innerspring mattress unit like this at Kay Manufacturing Corporation's High Point, N. C., plant. Pittsburgh Steel supplies Kay with 8-15½ gage upholstery spring wire for innersprings and high tensile wire for exclusive Kay-Arc sinuous springs for furniture.

PITTSBURGH STEEL UPHOLSTERY WIRE HELPS PUT THE "ZZzzzz" IN KAY SLEEP PRODUCTS

To assure restful comfort to the people who use his products, there's no rest for a manufacturer of innersprings.

Because he's dealing with one of the most basic human wants—personal comfort—the innerspring producer dare not be caught napping on product quality. But he can take comfort in Pittsburgh Steel Company's high carbon wire.

Kay Manufacturing Corp. of Brooklyn, N.Y., does—as do many other spring manufacturers.

One of the largest suppliers of springs and other components to bedding and furniture manufacturers, Kay depends on Pittsburgh Steel for substantial quantities of automatic knotting and coiling quality upholstery spring wire, and high tensile wire for sinuous furniture springs.

Why? Because Kay knows it can count on Pittsburgh Steel for high carbon wire with the consistency of size, tensile strength, ductility, toughness and soundness that form the starting point for innerspring superiority.

Plant Manager Martin Tuska of Kay's High Point, N.C., plant explains:

"To produce innerspring units with uniform characteristics, it's absolutely necessary that the wire forms and sets into springs that are identical in height, pressure, diameter and pitch.

"The wire can't have any hard or soft spots. We double wrap knots over the second turn on one or both ends of the coil. That takes high carbon wire with high, uniform ductility because the wire is twisted twice around its own diameter.

● **Needs toughness**—"It has to have special toughness, too. That is, it must have the strength and ductility to be compressed countless times without showing fatigue—to provide the deep, unchanging resiliency that only an innerspring can give.

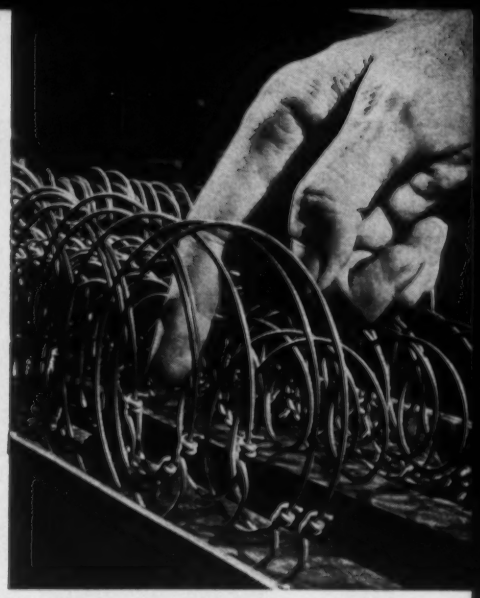
"I'd say that the quality and performance of Pittsburgh Steel's high carbon wire, from coil to coil, is very good."

Using upholstery spring wire from 8 to 15½ gage, Kay's High Point plant produces several hundred assembled innerspring units per day for many of the country's largest manufacturers of mattresses, dual-purpose sleep equipment and furniture.

Featuring the highest degree of

Compressed 2 inches, 5-turn innerspring of Pittsburgh Steel upholstery wire must respond with pressure reading of 6½ pounds; must hold height within ⅛-inch after stress relief.

Uniformity of Pittsburgh Steel wire assures long production runs on coiling and knotting equipment. Five-inch, five-turn coils are held to $\frac{1}{32}$-inch tolerance in pitch and diameter.



Ductility and tensile strength of wire get their toughest test during knotting. Kay double-knots innersprings, automatically twisting wire twice around its own diameter.

uniformity, units are assembled on automatic lacing machines in all standard sizes and coil counts from springs that are individually stress relieved immediately after coiling.

Through a quality control system based on programmed inspections, as well as spot checks, Kay maintains identical product uniformity through all seven production plants from coast to coast.

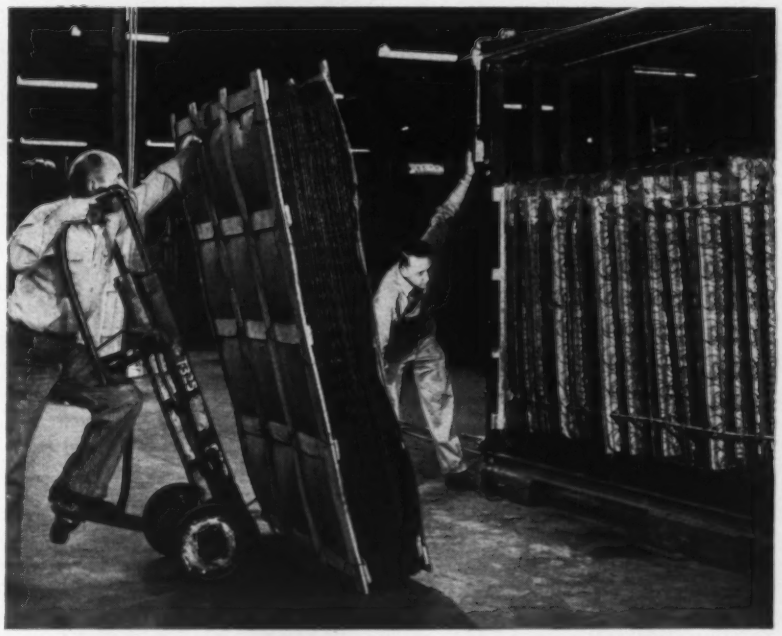
By making extra efforts to assure its customers a product of highest quality, Kay provides further proof of the superiority of innerspring bedding and furniture.

Steel spring construction, unlike slab-type bedding and furniture, offers the manufacturer-assembler versatility and wide flexibility in:

- **Design of finished product.**
- **Control of resiliency, density and degree of comfort.**
- **Selection of special finishing materials and components.**
- **Promotional features for attracting retail buyers.**

If you're a bedding and/or furniture manufacturer, take advantage of these benefits. They're available only with innersprings.

Or, if you're a bedding and furniture spring manufacturer, take advantage of the benefits inherent in Pittsburgh Steel Company's high carbon wires. The same experience in producing wire for special applications that helps Kay Manufacturing Corp. is available to you, too, from Pittsburgh Steel. Just contact one of the offices listed at the right.



Twenty completed innerspring units compress into a bale 11 inches thick—little more than twice the thickness of a single unit. Baling reduces bulk in shipping yet units retain full depth, resiliency when unpacked.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

Steel

Tubes ready for a Nialk Trichlor degreasing bath at Wolverine Tube Division of Calumet & Hecla, Inc., Decatur, Alabama.

HOW WOLVERINE TUBE CUTS DOWN DEGREASER CLEANOUTS

Cleaning the inside of a one-inch by thirty-foot copper tube sets up a problem.

Yet Wolverine Tube, Division of Calumet & Hecla, Inc., removes dirt and chips from these and gets them immaculate while maintaining widely spaced cleanout schedules.

The answer lies in the utilization of Hooker's Nialk® TRICHLORethylene, the solvent with *psp*—permanent staying power—in its stabilizer.

It keeps the bath from going acid, even with bits of metal in it. And it lets Wolverine use baths for tube operations three months before cleanout.

The tubes are cleaned at many stages. "We cannot use a solvent that might stain the walls of the tubing," says Dalton F. Jackson, metallurgist in the technical section. "Nialk Trichlor does not stain."

D. F. Jackson (L) of Wolverine and W. A. Ames (R) of Wittichen Chemical Company, Birmingham, Alabama, distributor for Nialk Trichlorethylene, examine degreased tubing.

Wolverine finds the system of degreasing tubes in vapor of Nialk Trichlor and then spraying them with pure condensate of the same solvent highly efficient.

The contaminated solvent from the degreaser is distilled and re-used. "Even after distilling it many times, Nialk still maintains a highly effective degreasing potential," Jackson says.

He is very satisfied with Hooker's technical service. "Whenever we have called for help, they have sent a representative promptly."

You can have the same benefits—regardless of the metals you're working with.

Talk to your Hooker Chemical distributor. Or write us. Our years of experience are yours for the asking.

HOOKER CHEMICAL CORPORATION

311 UNION STREET, NIAGARA FALLS, NEW YORK

HOOKER CHEMICALS PLASTICS

Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B.C.

Lou Krakowski, General Superintendent of the Harrison Sheet Steel Company, is a guy who makes no bones about what he wants. It's service! And, for twenty years, he has been getting what he considers the best . . . Cities Service.

Turning out, among many other things, 125 steel desks a day, he wants complete and dependable lubrication service. One of the many Cities Service products he uses to get this job done is Trojan H-2 grease. For general greasing on all equipment, multi-purpose Trojan H grease has a wide range of application. And, because of the variety of jobs Trojan H grease does, it reduces his necessary lubrication stocks.

If you have to *get it on the line* . . . call your nearest Cities Service office . . . or write Cities Service Oil Company, 60 Wall Street, New York 5, N. Y.

CITIES SERVICE

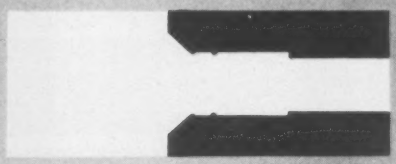
QUALITY PETROLEUM PRODUCTS

RIGHT NOW!

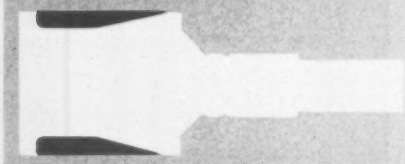
1 COMPRESSOR SHAFT

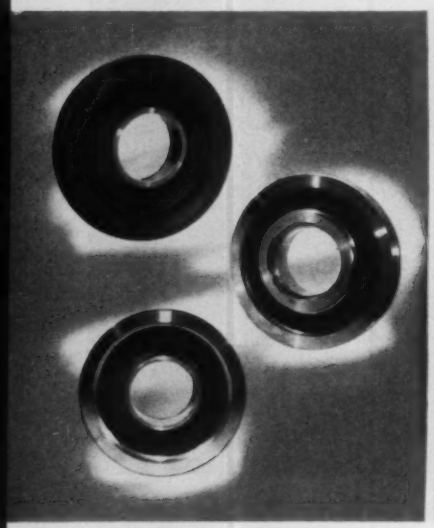
There are five operations involved in turning this part. Areas outlined in color in illustrations at right show metal removal in each operation. Handling this job on the Monarch Pathfinder Controlled Lathe results in 72% savings over the former method. Principally, these savings are obtained through the use of multiple cuts programmed to give an automatic cycle. A variety of tools and carbide grades are used in the turret to provide the best cutting action for each individual cut. Speeds and feeds are tape selected for each diameter change.

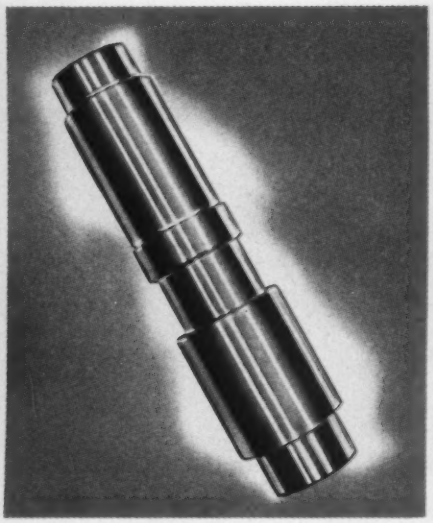
1. Rough turn excess stock (4 cuts).

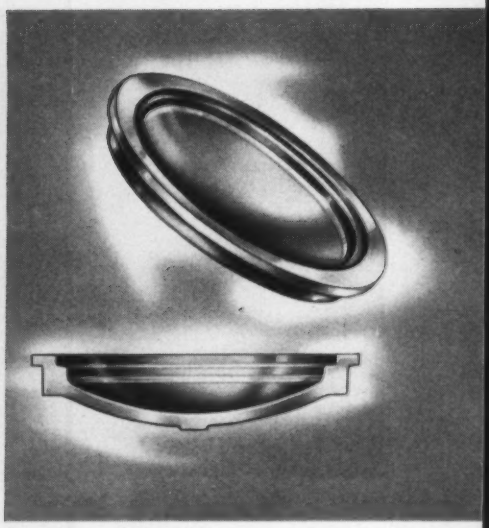


2. Dive to form flange (4 cuts).









2 GEAR BLANK

Material SAE-5150. Face Hub, Turn OD, Machine ID Web. Reverse Part, Turn Taper, Bore, Form Radius and Relief.

Method	Set-Up	Turn R.E.	Turn L.E.	Total 30 Parts	% Savings
Chucker	300 min.	3.5 min.	5.7 min.	576 min.	61%
N.C.	24 min.	3.5 min.	3.1 min.	222 min.	

3 PINION SHAFT

Material AISI-4145 Stock. Rough Turn, Undercut, Groove (2 diameters).

Method	Set-Up	Machining	Total 10 Parts	% Savings
Tracer	101 min.	13.9 min.	240 min.	68%
N.C.	12.5 min.	6.5 min.	77 min.	

4 INJECTOR RING

Material 347 Stainless. Face and Turn OD, Bore ID Hub and Taper, Turn 18-inch Spherical Radius.

Method	Set-Up	Machining	Total 6 Parts	% Savings
Tracer	130 min.	290 min.	1870 min.	77%
N.C.	16 min.	70 min.	436 min.	

MONARCH PATHFINDER CONTROLLED LATHES ARE SUCCESSFULLY TURNING PRODUCTION PARTS AT CUSTOMERS' PLANTS WITH CONTINUOUS PATH NUMERICAL CONTROL

3. Remove stock in undercut—feed left.

4. Finish turn complete—stem end. .

5. Form grooves.

RESULTS: 72% SAVINGS

Here are four examples of what can be done with Monarch Lathes "mated" with Pathfinder Numerical Controls. In each case a continuous smooth contour is produced by the numerical data which controls the tool path, distance and feed rate.

Why do we say "mated"? There are two important reasons why the machine control must be "mated" or "properly matched" by the machine tool builder to the specific requirements of the job. First, response of the control must be such that the machining capacity of the lathe is not limited. Second, accuracy of the lathe must be such that the full accuracy of the control is realized. Sounds academic, but these production examples prove it.

Monarch uses either one of several commercially available continuous path numerical controls on its lathes. These controls are "mated" at our factory to the following machines: Model 2013-16; Model 2516-20 Heavy Duty; Model 3220 Heavy Duty; and Model 4025 Heavy Duty.

When do you need a Numerically Controlled Lathe? Now is the time to investigate. Why not ask us to evaluate and review your turning requirements? Monarch's Numerical Control Department offers application planning, personnel training and field service. Write the MONARCH MACHINE TOOL COMPANY, SIDNEY, OHIO.

Ask about the Monarch Deferred Payment and Tool Lease Plans

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE
FOR A GOOD TURN FASTER . . . TURN TO MONARCH

Why do we say fulfills the promise

For single function or automated system... our Systemation concept is fitted to your actual needs

In crude definition, automation merely means "to make automatic." In implication, however, automation carries strong promise of low-cost production. It is in the area of lowering costs, some feel, that automation has most frequently missed its potential.

The engineering genius which can concoct sophisticated circuitry . . . join computers, primary detectors, instruments, processing equipment . . . too frequently overlooks the fundamentals of thorough *process knowledge* and such basic problems as the maintenance costs associated with automated systems.

Prudent investment of key importance

The *Systemation* concept is built around lowering *your* processing costs, increasing *your* productivity, improving *your* quality control. The starting point is not "what can be automated" but rather "what automation can be economically justified under your conditions of production."

Allis-Chalmers is thoroughly qualified to help you make *prudent* investment decisions about equipment and instrumentation.

Balanced judgment in depth

Long a supplier of control systems, a broad line of industrial processing and electrical generation, transmission, distribution and utilization equipment, A-C has an intimate knowledge of industrial processes. With the acquisition of Consolidated Systems Corporation last year, Allis-Chalmers extended its ability in the areas of data gathering, handling and utilization. CSC provides such experience acquired from more than 500 successful system projects.

Recently, Allis-Chalmers, Consolidated Systems and International Business Machines Corporation effected a nonexclusive mutual agreement relating to the production and marketing of automated control systems and processes.

For the typical system, Allis-Chalmers takes functional responsibility for the system using IBM data processing computer equipment, CSC specially engineered data conditioning equipment and instrumentation, and A-C basic and auxiliary industrial processing equipment. Now, Allis-Chalmers brings a balance of specialized judgments to bear on your problems . . . drawn on significant experience . . . to make major "contributions to the art" in many phases of *Systemation* and help you be sure before you invest.

Feasibility study shows opportunity

Your first step to Systemation *is a thorough feasibility study which spells out your opportunities for savings and puts a clear figure on the costs. Call or wire your nearest A-C office, or the Industrial Equipment Division, Allis-Chalmers, Milwaukee 1, Wis.*

Systemation is an Allis-Chalmers servicemark.

Systemation

pays its way

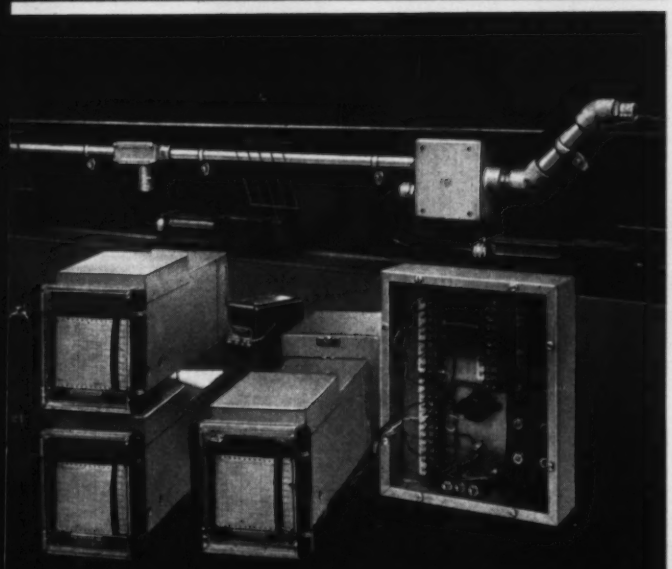
ALLIS-CHALMERS

A-1531

Systemation of automation?

HIGH SPEED TEMPER MILL features include: automatic digital extensiometer to indicate strip extension (hardness pickup); automatic slowdown for rolling maximum length at rolling speed, yet prevent mandrel explosion or tail-end roll damage.

PRECISE AUTOMATIC GAUGE CONTROL for thin tin with automatic screw reset.



AUTOMATIC BED DEPTH CONTROL for traveling grate in GRATE-KILN iron ore pelletizing process.

CENTRALIZED CONTROL ROOM for generating plant using one computer to automatically control two units for start-up, operation and shutdown.

Lower Your Machining Costs With This Remarkable Tool

Simply by penciling in a specification for FERROCARBO-treated iron when you order gray-iron castings, you can realize large-scale savings in machining costs. The increased surface machinability of FERROCARBO-treated irons, by independent laboratory test, is 31 to 63 percent. This makes possible savings in the machining of castings that may easily exceed their original cost.

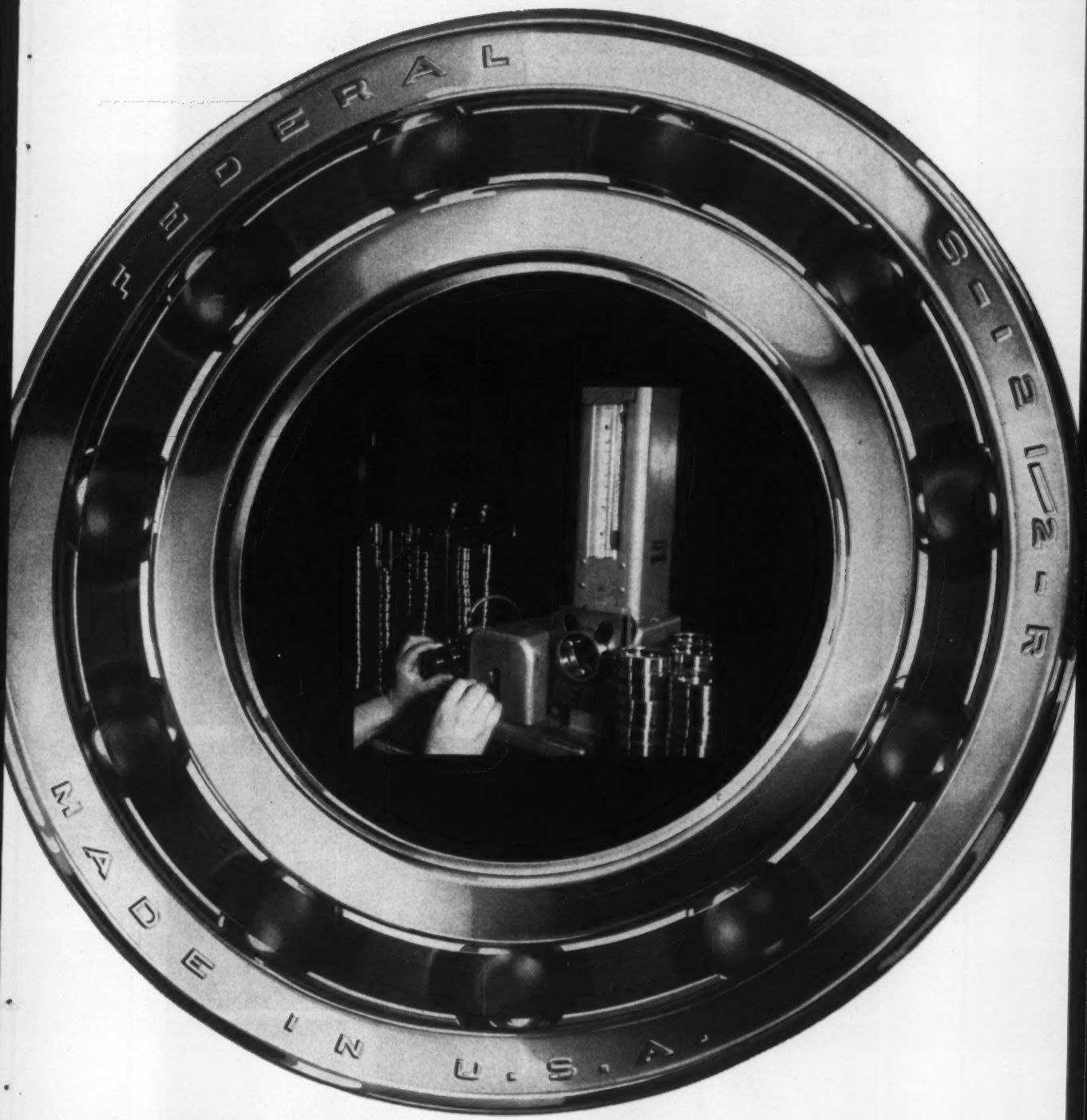
For faster machining, longer tool life and decreased down-time, always specify FERROCARBO-treated castings. They are available from leading foundries everywhere.

FERROCARBO® is a product by **CARBORUNDUM**

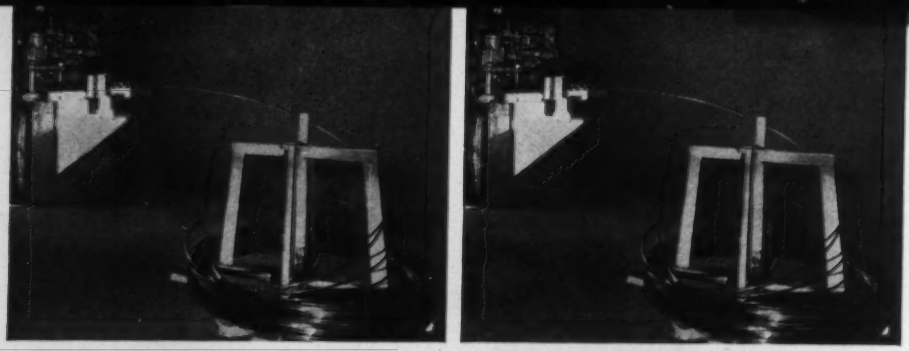
Complete technical data on Ferrocarbo is available to your foundries from Kerchner, Marshall & Company, Pittsburgh, Miller and Company, Chicago.

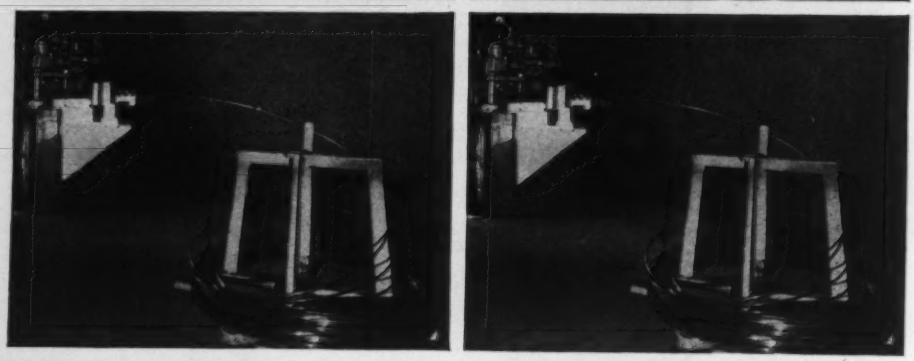
Federal
BALL BEARINGS

One of America's largest ball bearing manufacturers

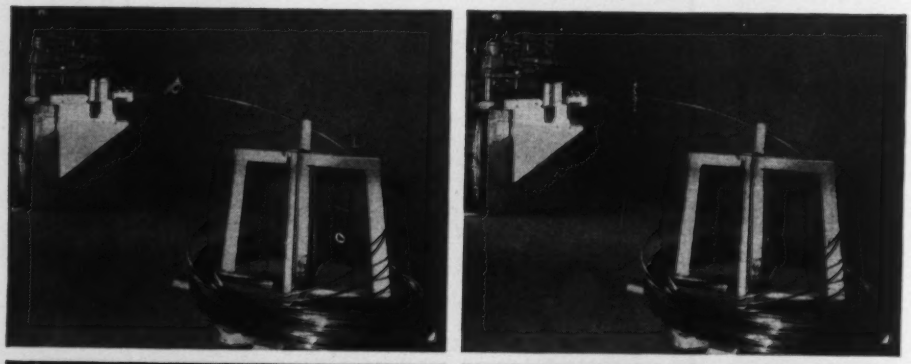


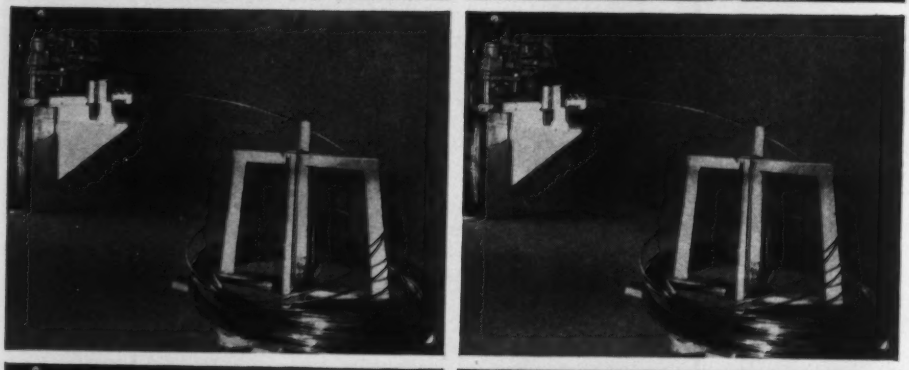
double-check Inner and outer race diameters of Federal Ball Bearings are gaged simultaneously to determine proper size of balls needed to assure the desired internal clearance for specific applications. Such selective assembly of mating parts shows up in more precise bearing performance. Another reason why so much of industry turns on Federal Ball Bearings. Our catalog gives vital statistics on hundreds of types in all sizes. Radial, angular contact, thrust, self-aligning, shafted. Single and double row. Open and sealed. Send for your copy today. The Federal Bearings Co., Inc., Poughkeepsie, N. Y.

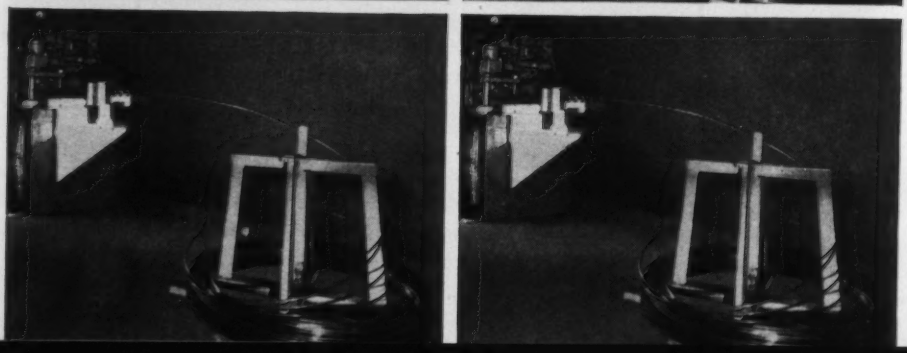


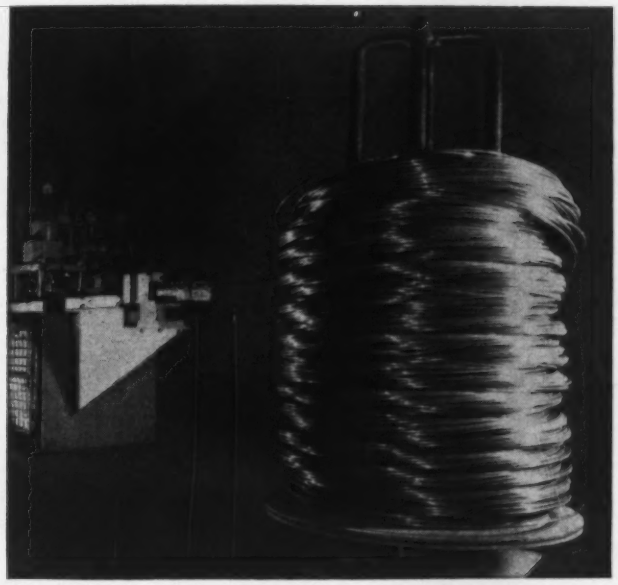


Why set up ten times....









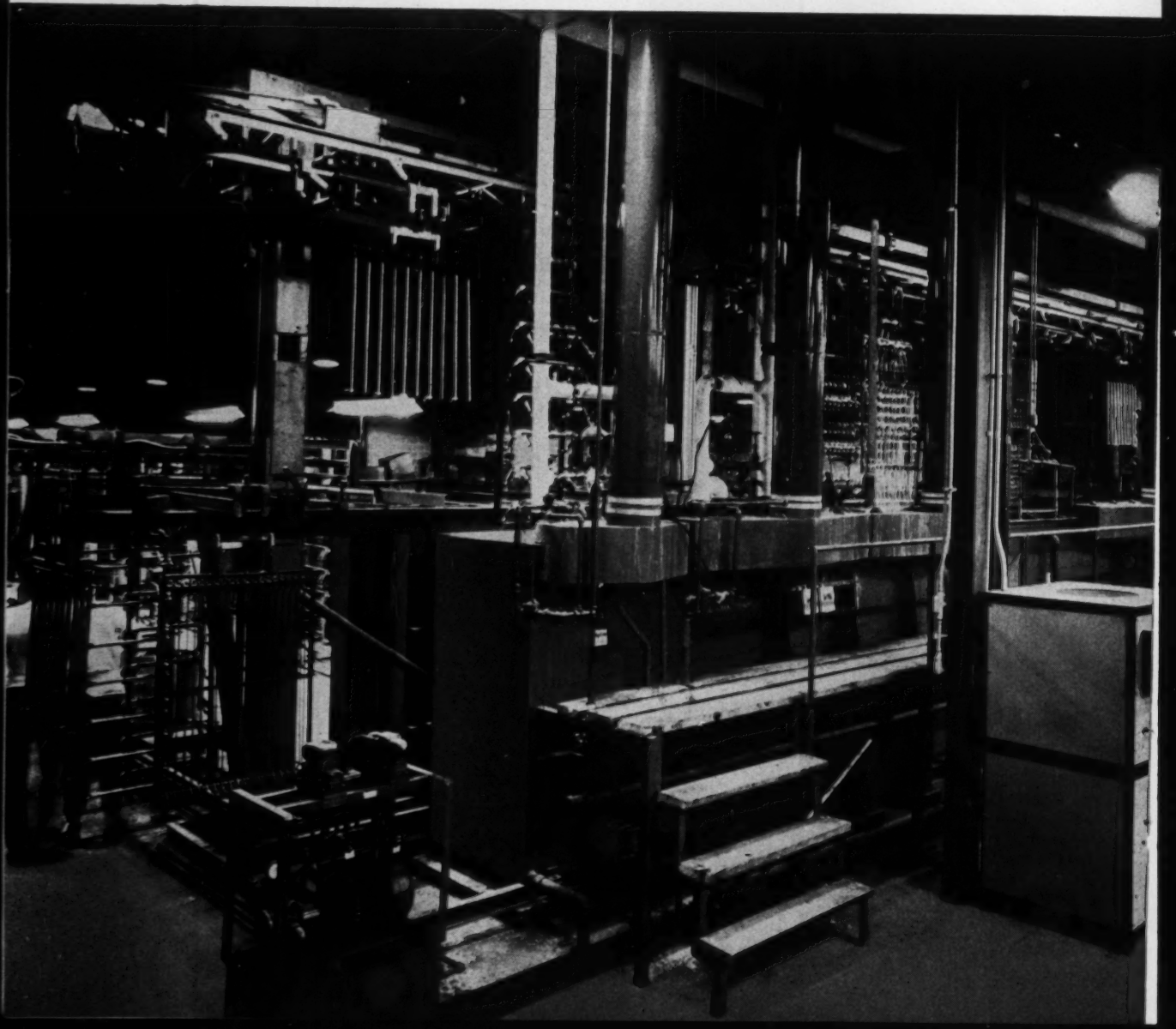
. . . .when once will do?

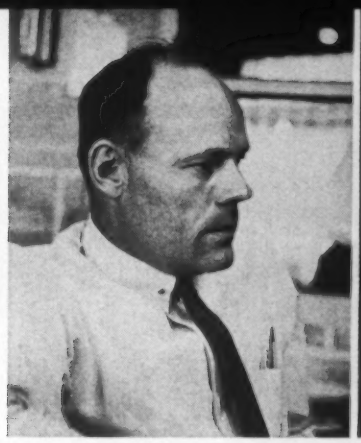
It's a simple matter to add up the savings heavyweight wire coils can give you. How much time does it take you to shut down a machine and start a new coil through? Multiply that by the number of times you have to do it in an 8-hour shift. Then figure that as much as 90% of that lost time is sheer waste. Because you could be using AS&W heavyweight coils that contain up to ten times as much wire in one continuous length. **Other savings:** less handling, less storage space needed, even lower scrap loss. Heavyweight coils aren't the only road to cost reduction: *American Steel and Wire offers a dozen different wire packages.* One of them is designed just right for your operation. Let us look at your set-up and recommend the best package . . . a simple step to increased production. Call our nearest sales office or write American Steel and Wire, Dept. 1487, Rockefeller Building, Cleveland 13, Ohio.

Innovators in wire

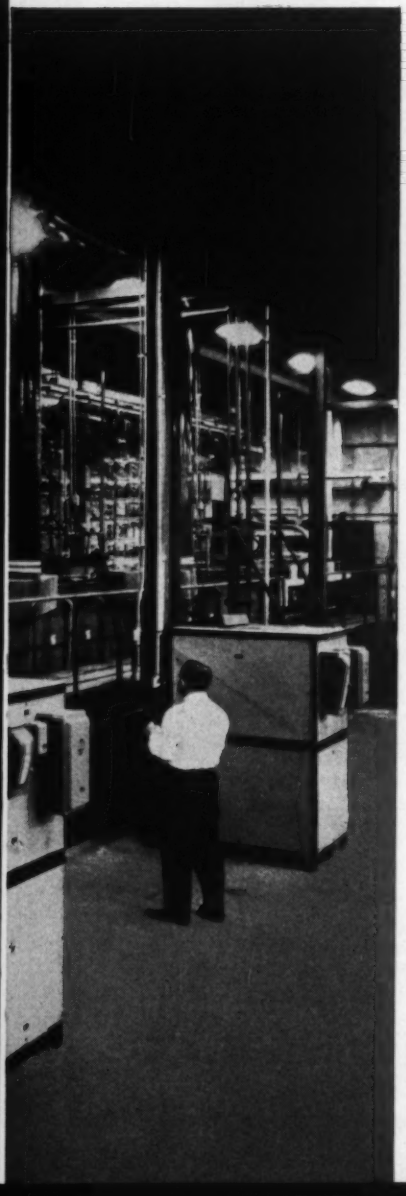
American Steel and Wire
Division of
United States Steel

here's plating **quality** at





its finest!



Udylite Full Automatic and the Incomparable "66" put more "sell" in accessories

"Our Udylite Full Automatic is the nucleus of the largest plating plant in the notions industry," states Mr. E. Desmond Lee, President of the Lee-Rowan Company, St. Louis, Missouri. "It was selected because of our need for increased plating production and its built-in quality control." ■ The customer-stopping appearance of Lee-Rowan accessories and closet convenience items starts with the base nickel plating. The Udylite Incomparable "66" Process provides the bright finish and top leveling action required for lustrous chrome plating or jewelry finishing in 24K gold. The result is a line of metal accessories that have become top-selling impulse items in notion departments across the country. ■ The Udylite Full Automatic, in conjunction with the many superior Udylite Plating Processes, assures top finish quality at the lowest possible cost-per-unit. Ask your Udylite Representative how you can improve your product appearance, boost sales and step-up plating production. Udylite engineers will then recommend the right machine and the right process for your specific application.

Udylite

THE UDYLITE CORPORATION
DETROIT 11, MICHIGAN

The Udylite Full Automatic installed at Lee-Rowan is 83′ 5″ long, 11′ 11″ wide and has a ceiling height of 14′ 4″. Racks are 30″ x 12″ x 54″.

MITSUBISHI INNOCENTI CWB

milling boring and combined machine

Universality, productivity and easy handling....

are characteristics of INNOCENTI-CWB milling, boring and combined machine.

MITSUBISHI ZOSEN (Mitsubishi Shipbuilding & Engineering Company) manufacture and distribute the FA 140/95 type (dia. of spindle 140 mm for milling, and 95 mm for boring) of this universally-known machine, licensed by INNOCENTI S.G. of Milano.

Overseas Agents

U.S.A.: Pratt & Whitney Co., Inc., West Hartford · **Canada:** J. H. Ryder Machinery Co., Ltd., Toronto · **United Kingdom:** Henderson & Keay, Ltd., Glasgow · **France:** Société d'Etudés de Machines Outils, Outillages et Accessoires, Paris · **West Germany:** Ernst Polak, Stuttgart · **Switzerland:** A. Ritschard Machines-Outils SA. Geneve · **Norway:** A/S G. Hartmann, Oslo · **Finland:** OY Machinery AB, Helsinki · **Netherlands:** Technische Import & Export J.L. Bienfait, Aerdenhout · **Sweden:** Lundwall & Co., Göteborg · **Denmark:** Scandinavian Phoenix A/S, Copenhagen · **Spain:** Liner Sociedad Anonima, Madrid · **Belgium:** R.S. Stokvis & Fils S.A., Brussels.

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Machine tool manufacturing division
HIROSHIMA PRECISION MACHINE WORKS

Sole agent
MITSUBISHI SHOJI KAISHA, LTD.

He's Watching a Band Sawing Miracle

This band saw operator at the Bell & Gossett Company plant in Morton Grove, Illinois, is watching "Controlled Accuracy". . . accuracy, being held to within a few thousandths of being perfectly straight, and he can actually *see* the band blade being guided in the saw cut to produce this accuracy! No further machining is required before the pipe is welded into an assembly for a Bell & Gossett Heat Exchanger Unit.

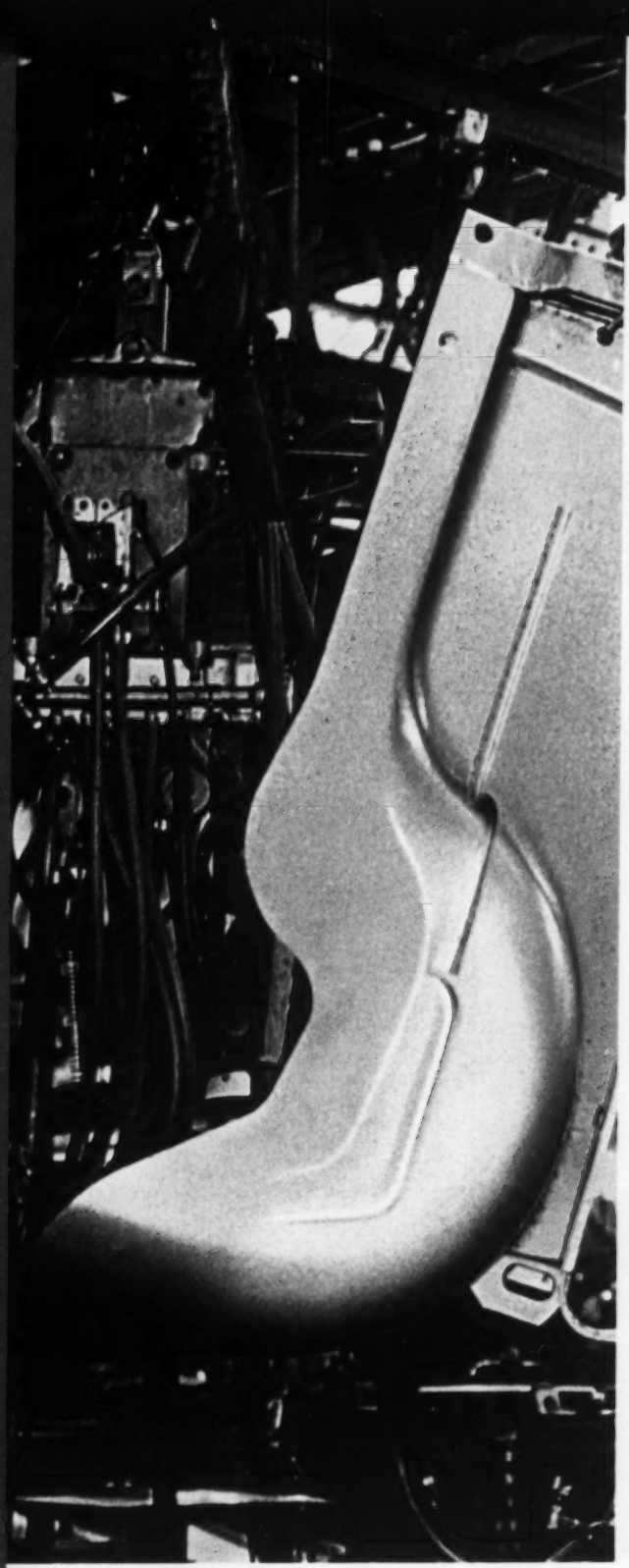
Band sawing accuracy like this is nothing short of miraculous—especially when it can be done on a high production basis, as Bell & Gossett is doing. And when the same tolerances can be held on cut-off pieces from 2″ to 18″ in diameter, this MARVEL #81 Band Saw Machine can be truly called a precision machine tool.

The secret of this amazing sawing accuracy is in the MARVEL "SURE-LINE" Automatic Accuracy Control—a simple and extremely effective electro-mechanical servo-mechanism that continuously senses and automatically corrects any tendency of a band blade to drift to either side of a desired line of cut. The "SURE-LINE" unit literally "steers" the blade to make a straight cut. This permits the use of heavier feed pressures and, when desirable, higher blade speeds, to do the work faster, without sacrifice of accuracy. Incorporated in the new MARVEL #81 Series High Speed Heavy Duty Hydraulic Band Saws, the "SURE-LINE" permits full utilization of all the advantages of high speed steel band saw blades—while extending their usable blade life as much as 50%.

Before you buy any band saw machine, get complete details on MARVEL #81 Series Single Cut, or Automatic Shuttle Type Bar Feed Production Band Saws—the machines DESIGNED AND BUILT TO REDUCE SAWING COSTS. *Write for catalog today.*

ARMSTRONG-BLUM MANUFACTURING CO.
5700 West Bloomingdale Avenue • Chicago 39, Illinois

MARVEL Metal Cutting SAWS
Better Machines—Better Blades



DRAW

New Youngstown rolling and annealing capacity means ready availability of higher quality sheet steel

New sheet steel from Youngstown thrives in an atmosphere all its own. In 50 new stack annealing furnaces, Youngstown sheet takes on the exact grain structure and degree of plasticity you need for forming. You get the precise working characteristics required for mild or deep drawing quality.

Quality control in annealing is only a part of Youngstown's sheet story. A modernized 79" hot strip mill with electronic testing devices and automatic gauge control equipment assures you of more uniform quality steel sheet. This giant mill rolls huge 38,000 pound coils, delivers fewer welds, reduces your coil "down time." Prior to annealing, cold tandem mills reduce thickness to strict tolerances and give the sheet its exacting finish.

Order new Youngstown sheet in widths from 24" to 72". Use it in mild and deep draws. Work with it. You'll find it delivers all the qualities you need. Specify Youngstown sheet from 28 Youngstown District Offices or from your nearby Steel Service Center. Specify Youngstown's new annealing process. Specify softness. Or tempered hardness. You can depend on getting precisely what you want, when you choose Youngstown sheet.

Youngstown – growing force in steel

For full details on Youngstown sheet and annealing write: Dept. 11-D,
The Youngstown Sheet and Tube Company, Youngstown, Ohio

New GE 3101 DATA ACCUMULATION and COMMUNICATION system...

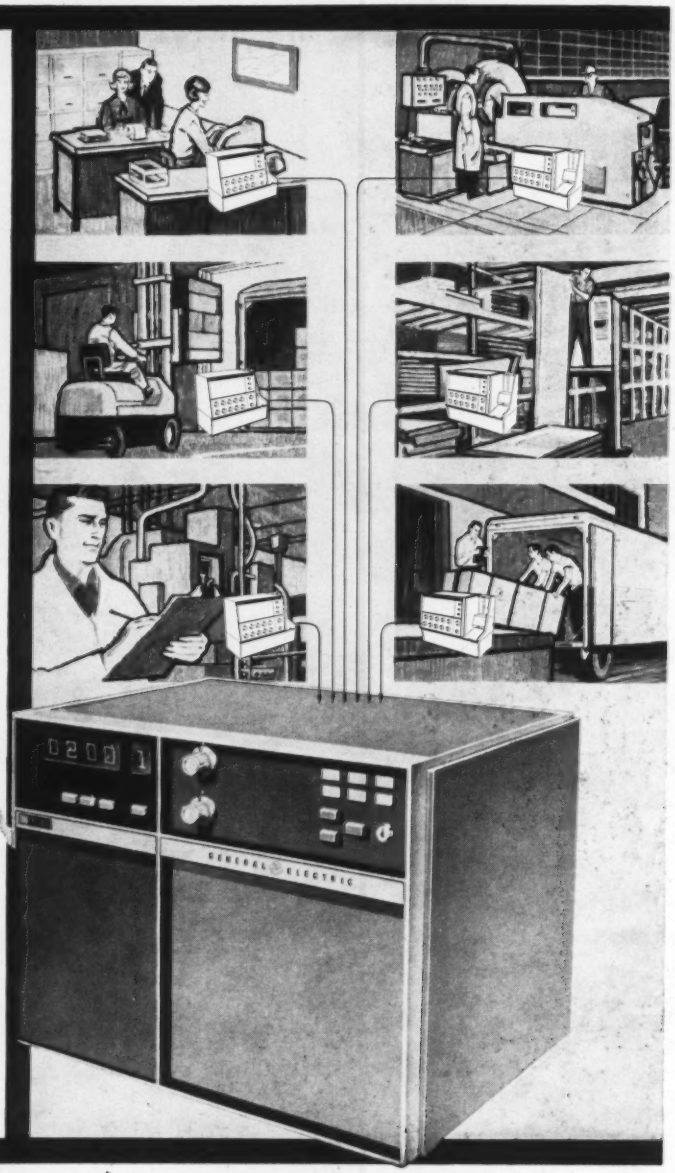
...provides immediate plant/ office data communication ...as a management tool to increase production and reduce costs.

The GE 3101 is General Electric's answer to the need for an economical and effective means of collecting operational data. Key areas such as purchasing, receiving, quality control, shop operations, warehouse, shipping, etc., send current data to a central point for collection and display. Each of the key areas has a Collector that sends data to the Accumulator, where it is punched into paper tape for a permanent record. Data originating at the Collector is from punched cards and/or 19 variable dial settings. Collectors may be up to 10,000 feet from the Accumulator.

The punched paper tape can produce a typewritten copy immediately for visual display of current conditions; can be converted to punched cards; or can be used for direct input to a computer system. Investigate this new, lower cost development by General Electric.

Installation of the GE 3101 information gathering system can result in greater operational profits due to: accuracy and timeliness of data, economy of operation, and quicker access to the facts for well informed decisions by management.

For more information, write for brochure CPB-183, General Electric Company, Computer Department, Section 92N11, Phoenix, Arizona, or contact your nearest General Electric Computer Department District Office listed below.



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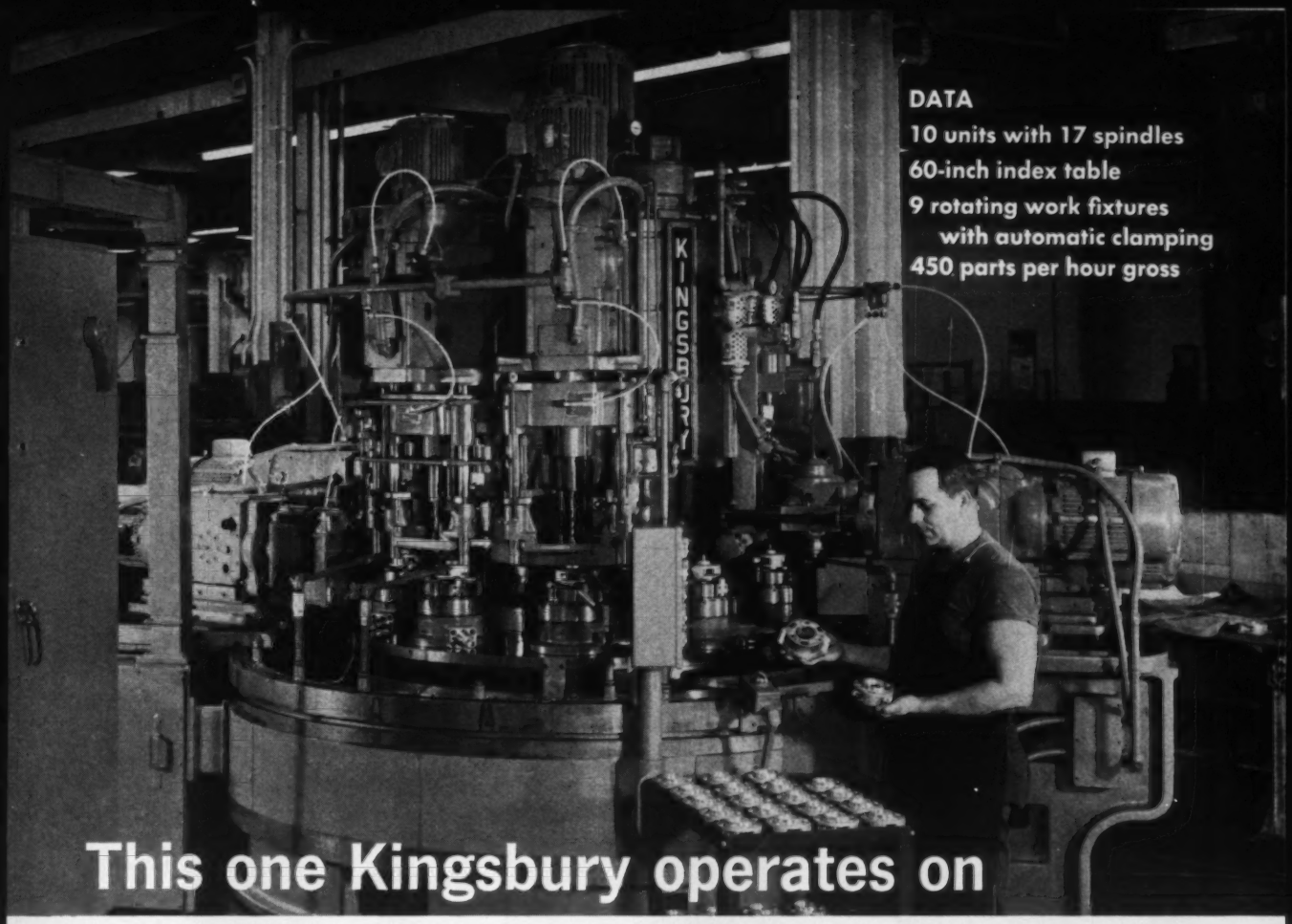
INFORMATION PROCESSING AUTOMATED BY GENERAL ELECTRIC

Progress Is Our Most Important Product

GENERAL ELECTRIC

CPA-92 (11-61)



DATA
10 units with 17 spindles
60-inch index table
9 rotating work fixtures with automatic clamping
450 parts per hour gross

This one Kingsbury operates on two different parts without changeover

Parts may be fed at random
This center column machine works on the two different parts shown with no changeover. The work fixtures hold either part without changing locators. Each fixture rotates 120° with each index of the table so the horizontal units can perform three sets of operations equally spaced.

Two of the vertical units drill two holes, one in each part. One unit drills Hole A in the bottom of the large part when its flange trips a micro switch. The other unit cycles every time, drilling Hole B in the top of the small part, "cutting air" in the large one.

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—Your machine can go right into your production line because our test runs before shipment guarantee uniform parts that gage.

May we make a proposal? Kingsbury Machine Tool Corp., Keene, N. H.

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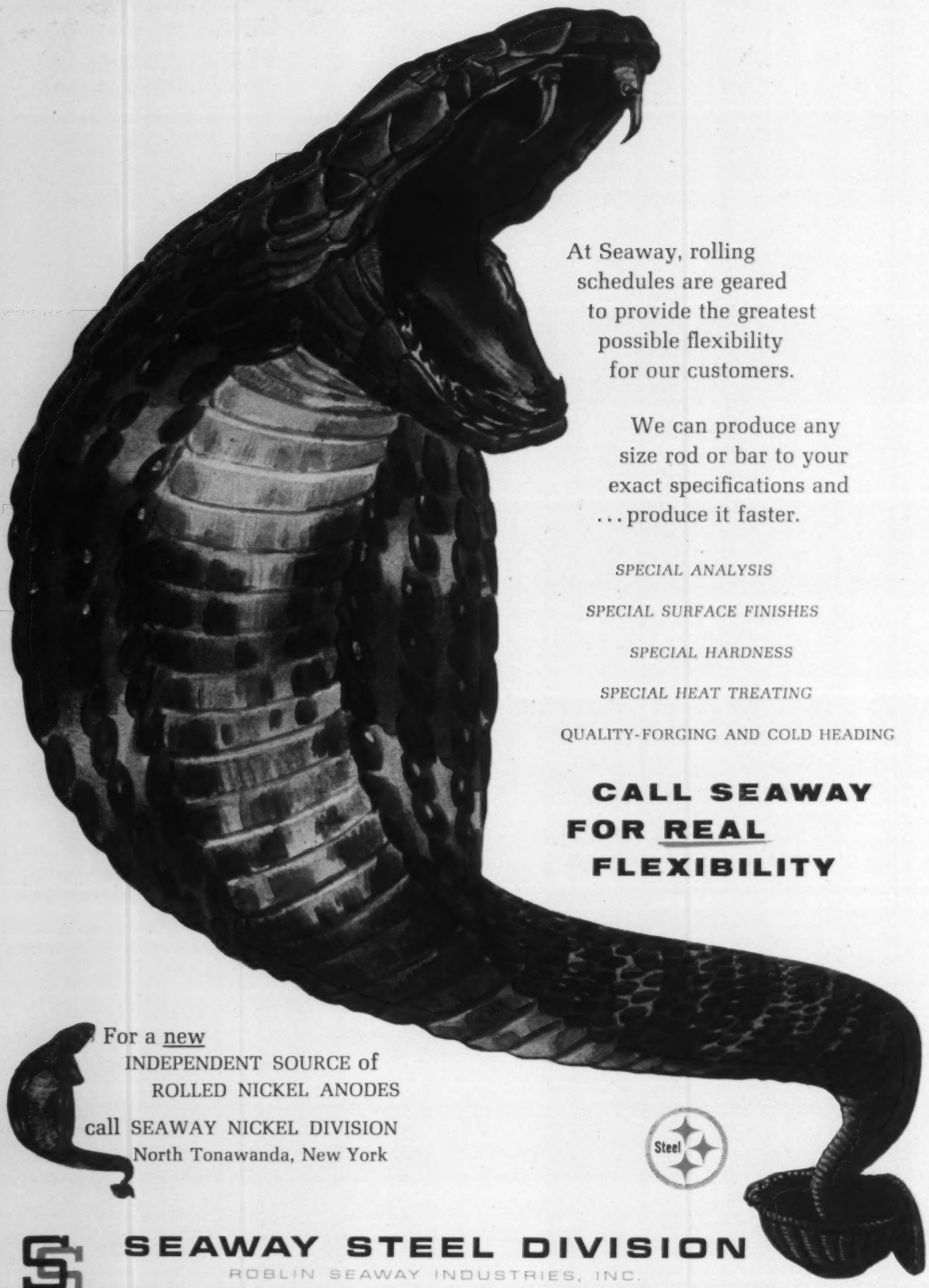
3 Horizontal Radial Units with Milling Heads
MILL 3 GEAR POCKETS 120° APART WITH 3.12 DIAM. CUTTER

3 Horizontal Units 45° Left of Radial Centerlines
DRILL 3 PAIRS OF HOLES 120° APART

2 Vertical Units
DRILL HOLE A
DRILL HOLE B

2 Vertical Units on Center Column
.563 CORE DRILL 3 HOLES
END MILL 3 PLACES

ALUMINUM PLANET PINION CARRIERS FOR AUTOMATIC TRANSMISSION



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OCTOBER AUTO SALES totaled 535,000 units. This is 1 pct below the October record of 540,000 set in 1960. Sales in the last 10 days of the month hit a record high of 191,000 units. And new car stocks on Nov. 1 totaled 661,000, compared to 925,000 on the same date a year ago.

A RECORD YEAR FOR CONSTRUCTION IN 1962 is forecast by F. W. Dodge Corp. The company predicts total construction contracts of $40 billion, a gain of 7 pct over 1961. Here's how it breaks down: Residential contracts up 10 pct to $17.5 billion; non-residential up 4 pct to $12.7 billion; heavy engineering up 6 pct.

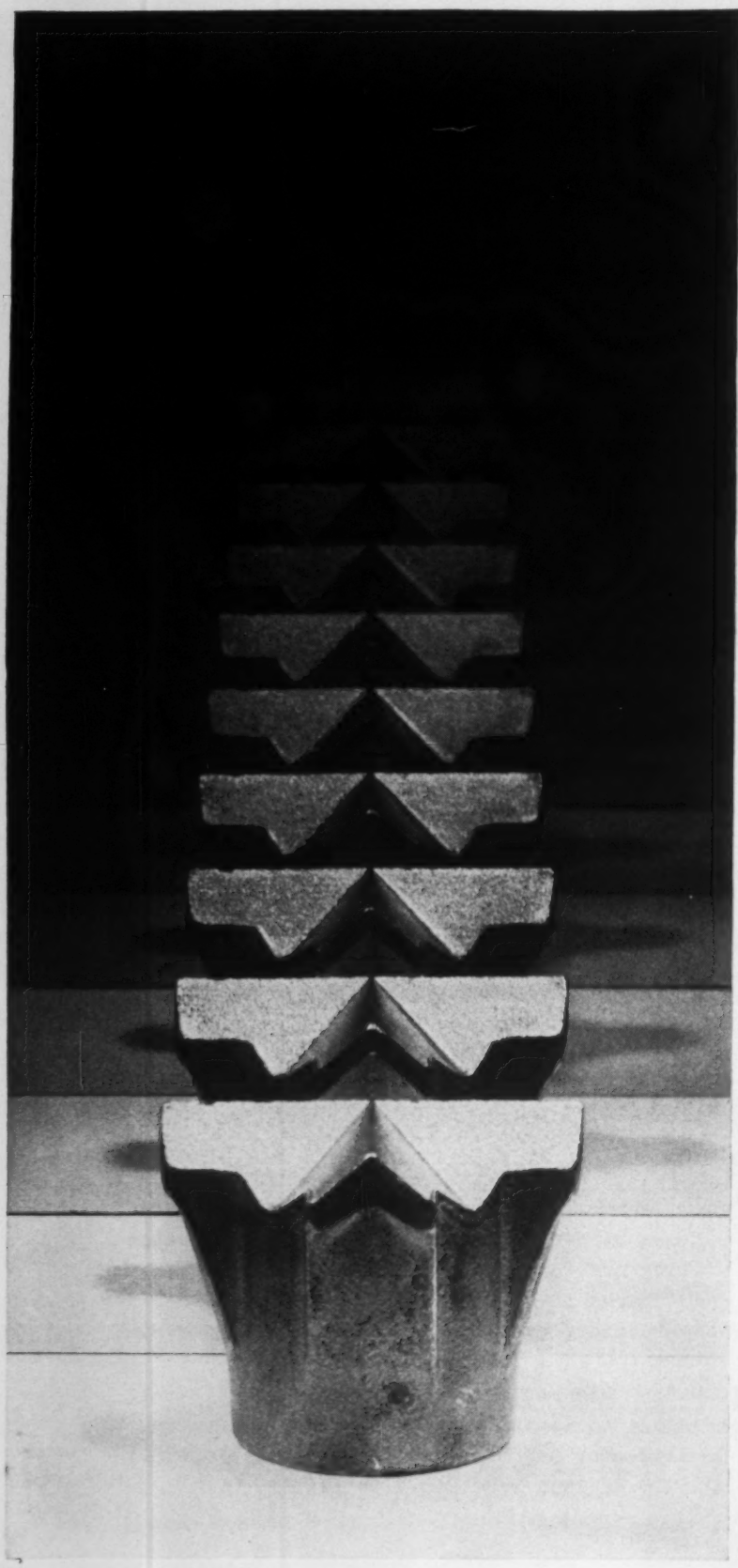
STEEL STOCKPILING BY BUYERS, in light of a possible steel strike, has been measured by Dr. J. H. Hoagland, consultant to the National Assn. of Purchasing Agents. He says a "significant number" of buyers believe an extra 60 to 75-day steel supply will be necessary to protect against a possible strike. Building stocks to that figure in six months, he points out, would require steel purchases be stepped up 30 to 40 pct per month.

SPENDING ON HOME REMODELING hit a new high of $4.5 billion in the second quarter this year. This compares with $2.3 billion spent in the first quarter.

TWO NEW ALUMINUM PRODUCTS are reported drawing interest in the chemical industries. One is tapered aluminum plate used in storage tanks. Savings are claimed in sidewall weight and welding time. The other product, aluminum drill pipe, is now being field-tested. Weight advantages are claimed here.

RECORD AND NEAR-RECORD SHIPMENTS WERE SET in three lines of steel in the first three quarters of 1961. Tinplate shipments hit 4.3 million tons, a new record. Shipments of galvanized sheets totaled 2.5 million net tons, second highest ever made for the period. And rebars hit a next-to-best high of 1.9 million tons for the same period, even though hard-hit by imports.

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows an 11.6 pct decrease from August to September. The September index was 223.3 (1947-49=100) for new bookings. The September shipments index was 225.4, down from 240.4 in August.



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OLD AND NEW: Aerial view shows a new 1200 ft lock along the Ohio River Valley. At left is old lock.

Industry Thrives as Ohio River Gets $Billion Face Lifting

Barge transport of metals picks up as construction begins on 19 new huge dams.

Main problems: Railroad opposition, tolls.
By T. M. Rohan

■ Since 1950, the Ohio River Valley has seen some of the country's biggest industrial growth along its shores. It comprises more than $17 billion worth of new and enlarged plants. But it's only the beginning. The big drawing cards have been ample water supplies and low-cost river transportation. And now these are becoming better than ever.

There's a 981 mile stretch from Pittsburgh to Cairo, Ill., where the Ohio joins the Mississippi. Here 19 huge, high-lift dams are being built to replace 46 smaller and outgrown ones completed in the 30's.

The new dams will have vast long-term effects in flood control and higher underground water tables. They will aid water conservation and will mean more industry along often dry tributaries. They will also provide low-cost river transportation and resulting cheap electric power. This is the real reason for the $1 billion, 20-year program. But the main publicity goes to the battle over rates with railroads and the question of tolls.

Railroads Oppose — Railroads look on the project as another avenue of subsidized competition in the form of toll-free barges. They have tried to assimilate barge lines to form "integrated transportation systems." But river men feel there is a basic conflict. One barge man compared himself to the Minutemen with one hand on the plow and the other on his rifle.

Already the building project has resulted in a speed-up in barge transportation. New locks are 1200 ft long or twice the maximum length of older ones. Since many tows exceed 600 ft, they have to be divided into two sections for double locking. This is time consuming. In fact, the waiting time has been known to reach two days. In many cases, of course, old locks will be retained for smaller tows. As a result, locking capacity will be increased.

Time Savers—The new locks can be filled or emptied in about 8 minutes. This compares with more than one hour per lock or 2½ hours for normal double locking. The optimists believe this could result in enough savings to cut Ohio River shipping costs in half. Barge company officials agree that shipments

would speed up. But the best they hope for on rates is to hold the line against more increases.

"The benefits of more water from these high-level dams penetrate to remote sections of the economy and geography," says Hudson Biery, executive vice president of Ohio Valley Improvement Assn. (OVIA), Cincinnati. He points out:

"On the upper reaches of the Kanawha River near Huntington, W. Va., there isn't any water left during the dry spell. Or certainly not enough for a plant to count on. So industrialization there has been slow. Now with Sutton and Summersville dams, the available water flow will be doubled back up the river as far as Charleston. This will help build up industry and employment in West Virginia."

Barge Tinplate—There is growing evidence of the long reach possible with water transportation. Steel mills in Chicago are barging tinplate down the Chicago barge canal and Illinois Rivers to the Mississippi. From here it goes to New Orleans and across the Gulf of Mexico to Tampa, Fla. Total distance: about 1900 miles. Yet the tinplate can be barged for less than it can be shipped by rail from the nearest big steelmaking center of Birmingham, about 550 mi away. It works out to $9.28 per cwt bare barge costs for the Chicago shippers to $10.10 for the Birmingham shippers. Of course, it also gives the Tampa canners alternate supply sources.

By the same token, Pittsburgh and Youngstown pipe mills (with a short rail haul to the river) barge oil country goods to storage stocking points in Kansas City, Louisiana and Texas.

Pittsburgh alone handles about 4 million tons of steel annually this way, mostly shipping out to river points. Pittsburgh steel fabricators also ship out huge shop-fabricated bridge sections by barge. U. S. Steel does enough shipping of these and other steel products to have its own barge line. Wierton and Wheeling Steel are major river shippers also.

Raw Materials—The raw materials intake is even more significant. About 26 million tons of coal annually pass through Pittsburgh by barge, mostly from Pennsylvania and West Virginia mines. This same low-cost coal movement has spawned low-cost river electric power plants—with generating costs of 2 mills per kw against the national average of 3 mills. Other big segments are atomic energy, chemicals, steel, and aluminum, appliance plants and communications.

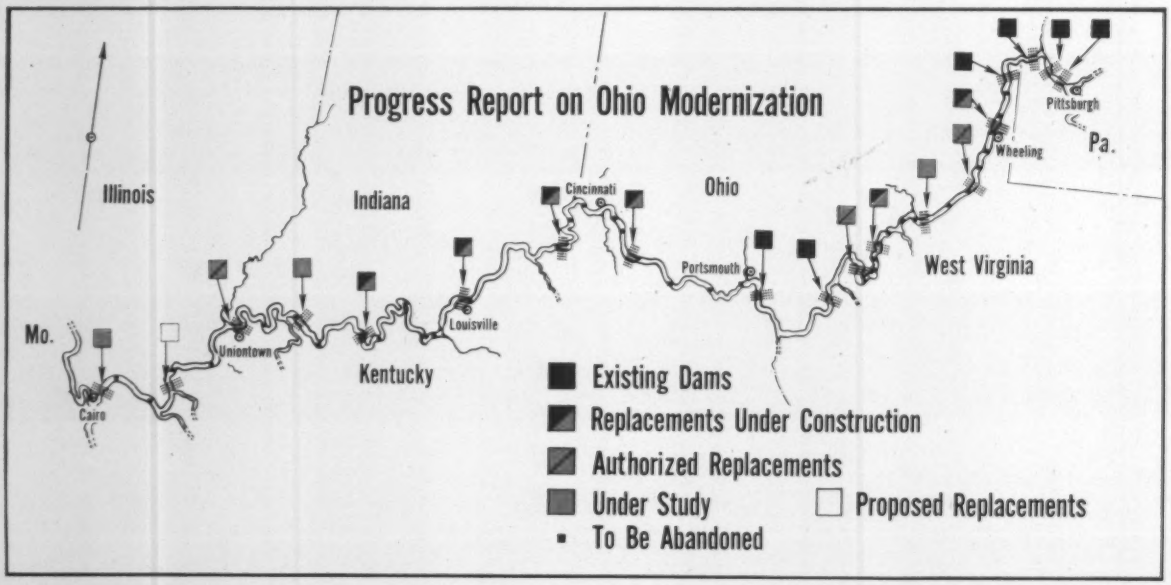
The tonnage carried by the Ohio River already is 1½ times that of the Panama Canal. It now handles 81 million tons compared with 22 million in 1929. This is about two-thirds the tonnage and half the ton-miles of the Mississippi. Yet a far greater increase is due.

The project will benefit transportation, flood control, industry and will provide more jobs, according to Brig. Gen. John L. Person (Ret. USA), president of the OVIA. He says the greatest growth will be in electric power "due to low cost water transportation of coal" and the fact that "some new power plants don't even have rail connections."

Barge Pioneer—One of the pioneer barge shippers is Jones & Laughlin Steel Corp. (See cover.)

"About 15 pct of the steel from our Pittsburgh and Aliquippa mills now goes out by barge," says C. F. Coombs, J & L manager of traffic and transportation. "It was about 9 or 10 pct about 10 years ago. And occasionally it has hit 22 pct. It has now been about 15 pct for 6

Where New Ohio Dams Are Coming



How Industrial Expansion Has Developed

Actual and Announced Capital Expenditures Ohio Valley Survey Area: 1950-1961 Summary by States

State	1960-1961 Survey	1958-1959 Survey	1950-1957 Survey	Total — 1950-1961
Alabama	$198,300,000	$212,500,000	$852,600,000	$1,263,400,000
Illinois	20,000,000	0	212,700,000	232,700,000
Indiana	97,600,000	39,500,000	577,500,000	714,600,000
Kentucky	504,200,000	274,500,000	2,369,700,000	3,148,400,000
Ohio	373,800,000	307,800,000	2,721,500,000	3,403,100,000
Pennsylvania	737,600,000	755,200,000	2,832,000,000	4,324,800,000
Tennessee	348,600,000	280,900,000	1,303,500,000	1,933,000,000
West Virginia	317,400,000	278,500,000	1,481,100,000	2,077,000,000
Survey Area	123,600,000	463,600,000	0	587,200,000
GRAND TOTALS	$2,721,100,000	$2,612,500,000	$12,350,600,000	$17,684,200,000

or 7 years and we expect the rise to resume with the speed-up from new, larger dams." Mr. Coombs adds:

"Our principal products going out are linepipe, flat rolled products including tinplate, and other general products. These are handled by common carriers but we also have 222 of our own coal barges which bring in coal from southwest Pennsylvania on the Monongahela."

Stock Points—Several years ago five downriver linepipe storage stock points were set up near Kansas City, and in Louisiana and Texas. Aim: to take advantage of water freight and to have local stocks. Inventories of 20,000 to 50,000 tons are carried in these spots by firms such as Jones & Laughlin, National Tube, Youngstown Sheet and Tube and Republic Steel. This has been a big marketing factor and should increase.

At Armco Steel the future is equally promising:

"The pattern of river shipments is definitely ascending but depends to a large extent on the differential with rail freight," says L. H. Juengling, vice president in charge of purchasing and transportation. "River shipments of finished steel are moving upward and we look for further extensions based on business conditions. Our biggest volume is in coil and strip and flat rolled products generally," he adds.

Armco also has heavy shipment of pig iron from its Ashland mill to the Butler, Pa. plant, a cold metal shop. Early this year, however, Armco disposed of its river coal barges in favor of a better rail rate direct to inland Middletown and Hamilton, O.

Barge Boom—Most directly affected are the barge line operators themselves.

"When more of the large locks are completed, we will probably get into bigger and larger tows and will be able to move all loads somewhat faster," says A. J. Brosius, assistant to the president of Union Barge Line Corp. of Pittsburgh. Union is one of the half dozen biggest river barge lines with 290 barges of its own plus charters and management of fleets for others.

At normal draft most barges carry about 950 tons. Twenty are bound together four abreast for about a 19,000 ton load.

The new locks will enable Union to use barges which will carry about 1450 tons. "Fifteen of these will be tied together three abreast for a 21,750 ton load," Mr. Brosius explained, "and will go through the 1200 ft locks in a single locking."

Hold Line—Mr. Brosius feels the new larger locks and dams will not bring on any drastic savings in freight cost but should help hold the line against further increases.

"Locking time will be cut from about an hour and a half now to about 20 or 30 minutes," he says. "But it will take somewhat longer to decelerate and position the larger tows. The cut from 46 to 19 dams is a big timesaver, but with the high level dams, each one must be locked through. With the older ones water was often high enough to sail right over the dam or low enough to sail through the locks with the wickets down." He adds that the larger barges cost about $60,000 compared with about $40,000 for the smaller ones.

Shipments from Pittsburgh take about 11 days to New Orleans and 16 to 18 days to Houston. Upstream it's slower: 26 days to Pittsburgh from Houston and 21 days from New Orleans. Bare barge rates, for iron and steel products in 600 ton minimum quantities (the same in both directions) are between Pittsburgh and Houston, $10.07; New Orleans, $7.50; Memphis, $4.58; Cincinnati, $2.54; and St. Louis $5.36.

OVIA Backing—A monumental construction project like this did not come into being without a good push. Most has come from the Ohio Valley Improvement Assn. at Cincinnati which actively campaigns in Congress for continuing annual appropriations.

BETTER-BOUND BOXES: U. S. Steel Corp. exhibit shows how metal strappings can improve packaging of boxes.

Package Machinery Seeks Status

■ Manufacturers of packaging machinery want to become a regular part of industry in the eyes of the U. S. government.

So say top officials who showed their latest wares last week at the 1961 Packaging Machinery Manufacturers Institute biennial show in Detroit.

The Packaging Machinery trade is big business reaching an annual sales volume of some $400 to $500 million.

Classification Problem—But hindering PMMI members is the fact that their occupation is listed in the government's standard industrial classification among "special machinery other than electrical."

"We've been trying four years to get our own SIC classification" says R. L. Sears, PMMI executive director. He says packaging machinery makers and sellers want to get more official information about their own industry. They want facts and figures on imports and exports in numbers, dollars, and types of equipment.

Just as important, although PMMI doesn't dramatize it, is the fact that it's difficult for a company to get materials in times of defense or war if it does not have SIC designation.

83 Firms—PMMI, a national trade organization founded in 1932, has 83 member firms. According to Mr. Sears, these account for 75 to 80 pct of the packaging volume in the country. They make and market all kinds of packaging machinery.

Mr. Sears thinks the industry will get action soon on the matter. But he says "it takes time," because "there are industries smaller than ours with a listing." A meeting with the Dept. of Commerce may take place in a few weeks.

Follow Costs—What is the price situation on packaging machines? "Prices closely follow the index of industrial costs," says Mr. Sears, adding: "If industrial costs rise, so will prices of our machinery, because a fair percentage of our cost is labor."

To some degree the industry is competing with foreign manufacturers. For example, an English machine earned popularity as the first to turn out flip-top cigarette boxes before American firms came up with them.

Avoid Hassle—Mr. Sears says the packaging machinery people don't want to get involved in the current government hassle over packaging.

"That's the business of the guy who does the packaging and not the one who makes the machine," Sears says.

Alcoa Revises Order Policy

Distributors to Handle Small Sheet, Plate Orders

Alcoa gives big push to 4000 lb minimum trend which began a year ago.

New policy may spread to other aluminum products.
By F. J. Starin

■ Aluminum distributors will be handling more small orders in the future. Mills will be handling as few as possible.

A trend in that direction among aluminum producers got a healthy push late last week. That's when Aluminum Co. of America announced it would not accept standard sheet and plate orders for less than 4000 lb. Nor will it take nonstandard orders of less than 2000 lb. These orders will be referred to distributors, Alcoa said.

Effects of the move were significant:

Double Business — Several distributors expect the minimum quantities of other mill products will also be revised upward. These include rod, bar, wire and tube.

Alcoa believes the change may almost double the distributors' sheet and plate business. At present, warehouses handle about 18 pct of the total, according to the National Assn. of Aluminum Distributors. Under the new order, Alcoa believes the distributor share might reach 30 to 35 pct.

The change also means these goods will be shipped to distributors at a 4.5 pct discount. However, the producers' cost of handling these small orders will be less and Alcoa feels these savings will offset the costs of additional discounts.

Until now, Alcoa accepted 500 lb sheet and plate orders. Reynolds Metals, which also set a new 4000 lb minimum, has been accepting nothing under 2000 lb for mill finished coil sheet.

Year Ago—Kaiser revised its minimum sheet and plate figure in the vicinity of Alcoa's new minimum about a year ago. Since then the trend has been growing.

The distributors won't argue with the Alcoa estimate of how much more business they may get. But they do feel that 35 pct is a long-range forecast. Few expect to achieve it within a year.

One warehouseman estimates his business in sheet and plate will show an immediate 5 pct gain. Another feels the pattern of warehouses turning over their stock twice each year may double to four times a year eventually, under the new approach.

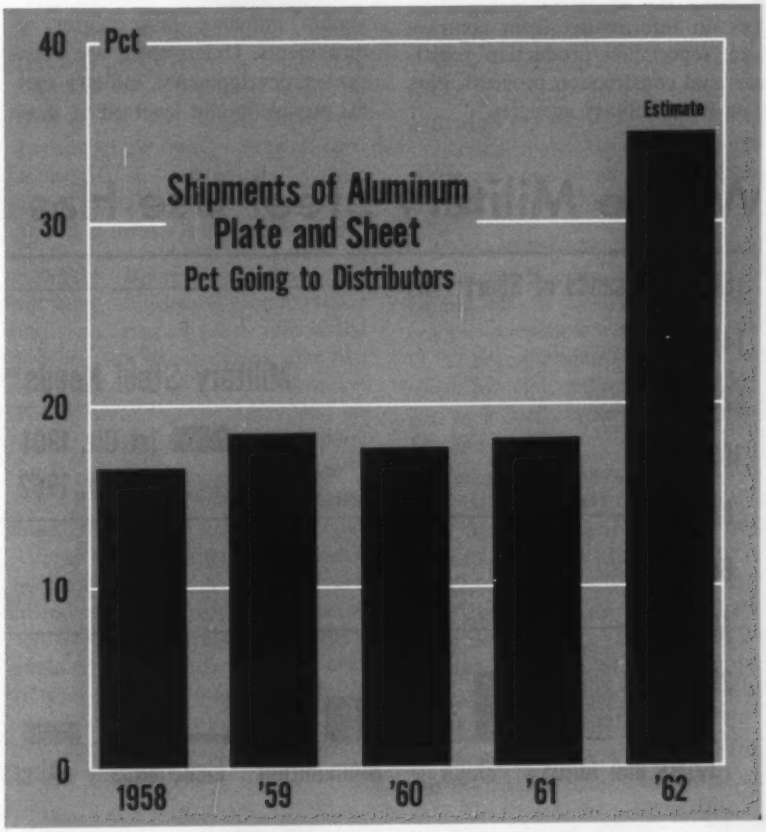
Reason Unclear—It is not quite clear whether the new attitude of the mills is due entirely to distributor pressure or to a recognition by producers of the high cost of filling small orders.

There's one thing everyone seems to agree on: The move will definitely smooth mill-distributor relations.

A. A. Smith, president of Adam Metal Supply Inc., New York, calls it 'the wisest thing the mills have done in a long time."

Good Omen—Lester Brion Jr., president of Peter Frasse & Co., New York, said the move was a definite sign the aluminum industry is "maturing."

A Big Lift for Distributors



Defense Metal Buying Speeds Up

By next quarter producers should feel the full impact of the new military buildup.

More steel, aluminum, and copper products will go into construction, tanks, ammunition, electronics, and other uses.

By P. J. Cathey

▪ Defense buying of steel, copper, brass, and aluminum products is rising.

The pickup has been noticed since the arms race intensified this spring. But the metals buying activity should reach a peak in the next quarter.

How DOD Estimates—The Dept. of Defense has released its first quarter direct requirements for controlled materials—copper, steel, and aluminum products. This data is supplied DOD from the military services. It's estimated by the services on information from contractors, reports on production schedules and construction progress, plus data from military agencies.

The DOD requirements for first quarter '62 include: 310,800 tons of carbon steel; 69,300 tons of alloy steel; 30,700 lbs of stainless; 39,200 lbs of copper and brass mill products; and 89,800 lbs of aluminum.

In each case these represent sizable gains over estimated metal needs for the same period in 1961. Steel needs (including carbon and alloy) are up 41 pct, stainless is up 18 pct. Copper and brass mill products (including wire and foundry items) have increased more than 50 pct. And aluminum requirements are up 38 pct.

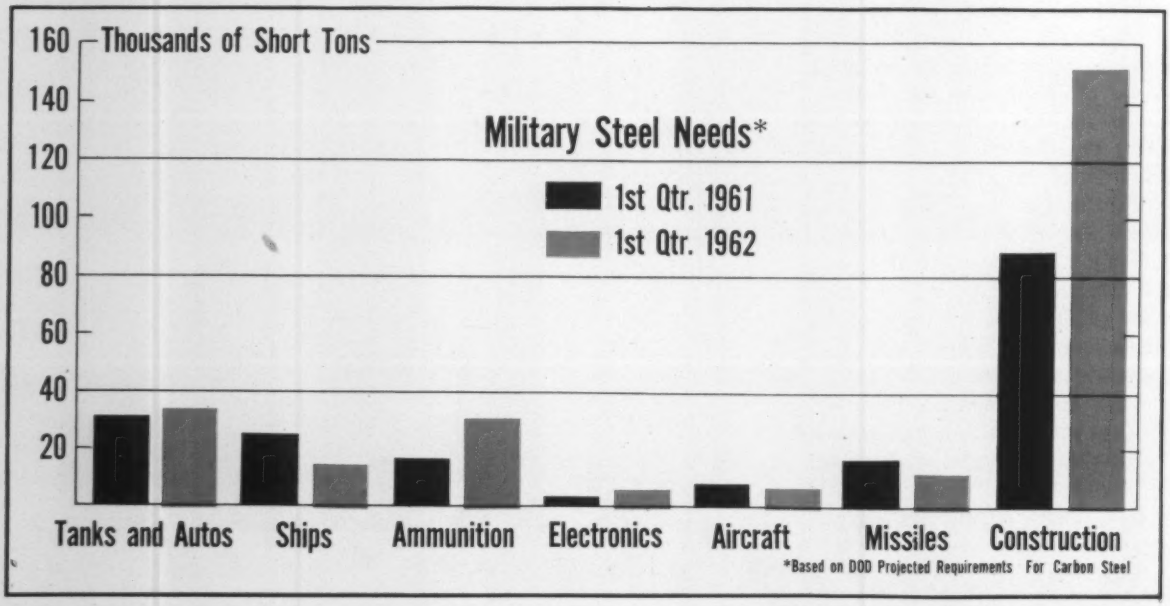
Full Effects — Pentagon metals experts believe the first quarter will reflect the full effect of the new arms buildup. Carl Rolle, Office of the Secretary of Defense, says, "While events can quickly change military metal needs, most of the stepup in spending announced earlier this year should influence first quarter requirements. Unless there are unexpected developments, military metals buying should level off at those amounts for the near future."

Construction, Ammo and Autos —DOD coding, based on the programmed use of the metal bought, shows the influence of new thinking about military preparedness. (See chart.) Since the first three months of '61 carbon steel buying for construction, ammunition, tanks, autos, and electronics has greatly increased. Purchasing for aircraft, missiles, and weapons has either increased little or dropped off slightly.

The large boost in steel for construction mainly reflects the building of undreground launching bases for missiles within the U. S. Sizable amounts of plate, reinforcing bar and other steel products are used in this construction.

Where It Goes—Based on defense program needs, here are first quarter '62 requirements for carbon and alloy steel products: Aircraft—14,700 tons; missiles—19,700 tons; ships—19,100 tons; tanks and automotive — 49,900 tons; weapons—

Where Military Steel Use Has Increased



5,900 tons; ammunition — 35,000 tons; electronics—7,900 tons; building and supplies—5,200 tons; construction—165,000 tons; and maintenance, repair and operating supplies—15,500 tons. Additional tonnages, in lesser amounts, will go into other defense programs.

Products in Demand—In terms of products, among the largest groups in carbon steel are sheet and strip, plates, shapes, and reinforcing bar. Among alloy steels the largest include ingots and billets, hot-rolled bar, and plate.

A good portion of the stainless needed will go into aircraft and missiles. These groups will account for more than 19,000 lbs of the 30,700 lbs required.

In nonferrous metals, the largest consumers of aluminum will be aircraft, missiles, tanks and autos, ammunition, and electronics. Products most in demand will be sheet, strip, and plate, extruded shapes, and rolled, forged, and impact extruded stock, rods and bars.

Controlled Materials—In all, the DOD designates eight categories of controlled materials. These are carbon steel (including wrought iron), alloy steel (except stainless), stainless steel, copper and copper-base alloy brass mill products; copper wire mill products; copper and copper-base alloy foundry products and powder; aluminum; and nickel alloys.

Under the present Defense Materials System these are used to identify direct requirements for priority materials. In addition to these direct military requirements, contractors also make use of Class B products.

Class B Products — The Class B products are those containing any controlled material and listed in the product lists of the Business and Defense Services Administration, Dept. of Commerce.

Military setasides (space reserved on mill schedules each quarter) are based on the direct requirements, plus a percentage to include Class B products.

Nuclear Rocketry Soaring Ahead

■ With the U. S. nuclear rocket program headed for a spending peak of $94 million in 1962, the missile industry reports that the nuclear rocket is already beginning to crowd earlier schedules.

It is now expected that the NERVA nuclear rocket engine, for which contracts were let this year, will emerge with 50,000 lb of thrust. It is scheduled by the National Aeronautics and Space Administration for completion in 1966-67. But, rocket builders say, with growing U. S. knowhow in heavier rockets, it could arrive as early as 1965.

Giant Rockets—More important, they point out, preliminary designs, backed by industry funds, are already under way for nuclear rockets of 250,000 lb thrust, and another school of giants rated at 750,000 to 3 million lb thrust. All would be powered by liquid hydrogen changed to gas by a nuclear reactor. In addition, a "fast reactor" engine group, ranging from 10,000 to 30,000 lb thrust, is being developed.

Whose Money — Industry is watching the growing atomic rocket future and putting funds into initial designs. It's worth noting that two of the major U. S. liquid fuel rocket engines were initially developed by rocket builders using company funds.

R. F. Trapp, Supervisor of the Space Propulsion section, Douglas Aircraft Co., speaking at the Atomic Industrial Forum in Chicago, discussed a nuclear rocket engine of 50-100,000 lb thrust. He said it might cost $300 million spread over 10 years. Peak annual expenditure would be $60 million, and the initial five-year development period would see the heaviest outlay.

Thrust Per Dollar—On this basis, he estimates, a 250,000 lb thrust engine would cost one-half billion, with $100 million spent in the peak year. And a 1 million lb thrust engine would cost $1 billion, with $174 million spent in the peak year.

Little has been said of the development of such nuclear engines. Mr. Trapp traces development of all three engines to a starting point in late 1959, and his tables would give the U. S. a 50,000 lb thrust engine by 1965.

Yearly Cost—Peak outlays in any year, to develop all three engines in the same period, would hit $300-330 million in 1965-66. The 250,000 lb thrust engine would arrive in 1966. We'd have a 1 million lb thrust engine a year later. These figures are two to five years ahead of earlier estimates.

Why a nuclear engine? It's believed a nuclear rocket would go aloft with one-third the fuel load of a chemical rocket. In space, it could reach its goal in as little as one-half the time of the ion rocket.

Unusual Payoffs — The ill-fated atomic bomber cost a billion, but is paying off in light-weight atomic reactor knowhow. Similarly, the U. S. began a sharp attack on the tough job of handling liquid hydrogen as a fuel a year ago (IA, Jan. 14, '60, p. 28).

The atomic rocket is looming very large and very near. It's advent hasn't changed the chemical rocket's outlook a great deal. Aerojet General recently completed a study for NASA on super rockets, using liquid fuels, of 2 million to 24 million lb thrust. Last year, our biggest rocket engine was rated at about 150,000 lb thrust.

The missile gap may still exist in the big rocket field, but American gains in 12 months are startling.

Tool And Die Price Hike Due

Present Prices Would Force More Shops To Close

Lower tool and die shop capacity and bigger volume of winter orders promises to push up prices, stretch lead times.

The best guess is that prices will start to rise about January.

■ Prices of tools and dies may go up in the next few months.

Promises on delivery time for this equipment may stretch out between now and spring.

Those involved in producing and selling tools and dies claim that prices cannot stabilize at present levels without more companies dropping out of business.

Capacity Down—They look for rising prices during coming months because tool and die capacity is lower now than it has been in some time because of the decline in the number of shops. And lower capacity means that job volume that has been considered normal the past couple years will be harder to handle. This will mean more overtime and greater costs.

Also a bigger volume of orders is awaited this winter than in the past two or three years. In terms of simple supply and demand, this would tend to raise the floor on prices above present levels.

It is awkward to determine when prices will rise and by how much. To a degree, this will depend on when the volume of releases reaches the point where overtime work will have to be used. This may be around the first of the year.

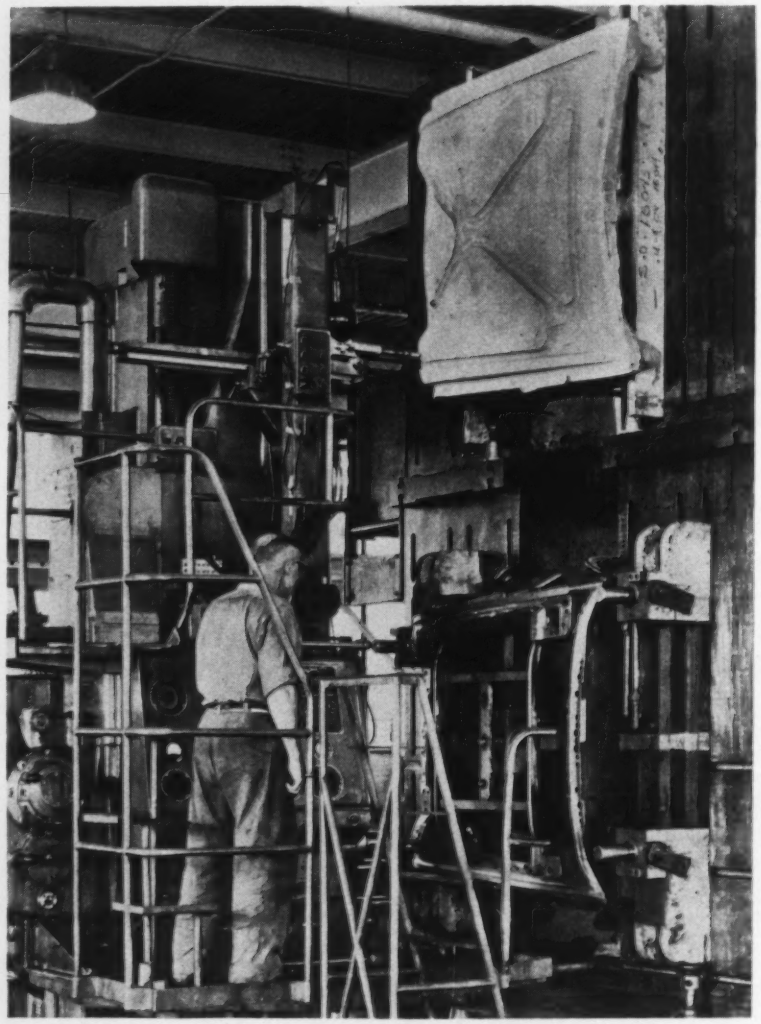
However, word is that the really fierce competition between shops has diminished to some extent for large die jobs. And it may soon subside on medium and small die work.

Deliveries—On large dies, many shops are promising March, April, and May delivery. But the work load appears to be mounting. Some late customers may have to wait until June to get orders filled.

On such jobs as large panels for automobiles, which take 3000 to 5000 man hours of work, many shops are unable to make delivery before May 15. But the length of time is dependent to a large extent on the size of the equipment ordered.

If the job has to be designed from the ground up, this seems to be the average time for delivery for various sizes of dies at present: Small (1 ton and under), 8 to 10 weeks; medium (1-10 tons), 12 to 14 weeks; large (10-20 tons), 18-22 weeks; extra large (over 20 tons), 20 to 26 weeks.

If the die has already been designed, the time for making and



BUSY SHOP: A kellering operation is done on roof panel of a foreign car in one of Detroit's newly-bustling tool and die shops.

delivering it would be around 8 weeks for small dies, 12 weeks for mediums, 16 weeks for large ones and 20 weeks for extra large.

Stretching out of delivery time will not make automotive companies happy. Some will be sweating out delivery next June.

Auto Picture—Generally this is the auto picture on tool and die ordering: Ford Motor Co. got its programs in very early. Chrysler Corp. got some in early, but still has more to come. Fisher Body Div. of General Motors Corp. has placed some orders. But some GM divisions have yet to place significant orders. They are seeking May delivery of tools and dies but are said to be willing to accept June delivery on major panels.

Any company that has a crash tooling program in mind could be left out in the cold next spring, tool and die shops indicate.

Defense Orders—Meanwhile, for the 12 months between July 1, 1961, and July 1, 1962, some $100 million has been allocated to the Dept. of Defense for machine tool and production equipment purchasing. The $100 million is $60 million more than the 1961 outlay. The total will break down into $60 million for the Air Force, $25 million for the Army and $15 million for the Navy.

Reports are diecasters expect that a recent upturn in custom diecastings will carry into 1962. They are facing the near future with optimism. They think output of aluminum diecastings will set a record in 1962, that zinc castings will run at about the 350,000 ton level normal for a high auto production year.

Time for a Change—All this spells good news for tool and diemakers, who have had lean years recently. The independent shops have seen much of their work absorbed by their biggest customers, particularly automakers, and tooling orders have declined.

Now, with a smaller group of shops available for the tooling orders, the survivors may now see a significant return to prosperity.

SIZING UP A MARKET: W. O. Robertson, president of Armco Drainage & Metal Products, Inc., and architect Carl Koch, inspect an Armco system.

Armco Plan Attacks Housing Market

■ The housing market has long loomed in the sights of primary metal makers as a huge potential market. Armco Steel Corp. has designed a plan that might capture a sizable part of it.

Armco's new building components and structual systems plan is aimed at a point somewhere between the two tons of steel now used per home, and the 12 tons used in all-steel homes.

New Approach—It rejects the all-steel home approach, preferring to use steel in combination with other materials and structual systems. The plan relies on the basic cost of steel and the economic factors present on steel as primary considerations. Savings could be as high as 10 pct.

W. B. Quail, vice president, distribution, told The Iron Age that the concepts advanced will be demonstrated in an independently financed apartment project in Middletown, O.

Architect Consulted—Carl Koch and Associates of Cambridge, Mass., carried the Armco plan into the residential architecture field.

The Koch-Armco roof-ceiling system uses 24-gage aluminized steel panels for the roof and Armco zincgrip sheet for the underside; C-shaped steel purlins join the two. Estimated cost is $2.00 per sq ft installed, compared to $2.75 for conventional construction, Armco says a special finish will allow the underside to be painted.

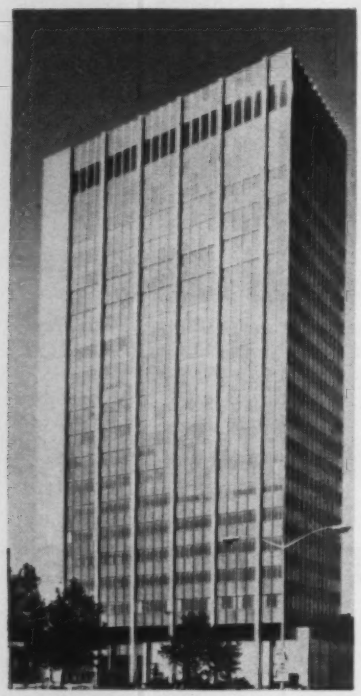
Dual Purpose — Half round arches over interlock Steelox panels form the base for the eight inch concrete floor. The arches allow integrated ductwork for heating, cooling and possibly electrical systems.

Huge Market—The Middletown apartment will be a first step into the housing market which Armco estimates at 1.3 million units. Success in the market will give housing an importance second only to the automotive industry as a steel user.

Engineering Groups Have New Home

United Engineering Center is the new $12 million home of 20 U. S. engineering societies.

The 20-story structure, near the United Nations building, was officially dedicated last week. It replaces the old Engineering Societies building at 29 West 39th Street in New York.



NEW HOME: $12 million center.

Adds Stature — "This building gives stature and dignity to the profession," says S. W. Marras, secretary and general manager of United Engineering Trustees, Inc., owner and operator of the new facility. Some of the societies headquartered in the building are American Society of Mechanical Engineers, American Institute of Mining, Metallurgical and Petroleum Engineers, American Welding Society, American Institute of Industrial Engineers and American Institute of Electrical Engineers.

The societies will share the Engineering Societies Library, with 180,000 volumes, 27,000 maps, 10,000 indexed bibliographies and thousands of technical papers. Allied with the Library is Engineering Index, Inc., a reviewing service that annotates and indexes current technical periodicals.

Need for the new building was pointed out by Ernest Kirkendall, secretary of the Institute of Mining, Metallurgical and Petroleum Engineers. "We had to move some place. The three engineering societies that started in the old building totaled 16,000 members. Our society alone now has over 36,000 members."

ACF Consolidates Rail Carbuilding

ACF Industries, Inc. will close its Berwick, Pa., plant late next year. It will consolidate railroad carbuilding activities in three other plants.

William T. Taylor, chairman, said reduced overhead and greater efficiency prompted the move. Consolidated and modernized freight and tank car production will be shifted to American Car & Foundry Div. plants at Milton, Pa., Huntington, W. Va., and St. Louis.

Tool Builders Testify on Imports

Machinery and machine tool builders worried about foreign competition will get a chance to lay their complaints before Congress.

Industry spokesmen will testify on the impact of imports and exports on their businesses before a House labor subcommittee headed by Rep. John H. Dent (D., Pa.)

The hearings, to be held Nov. 27 to Dec. 5, will also include representatives of the power generating equipment, transportation equipment and shipbuilding industries.

Argentina Ramblers Roll in January

First Rambler automobiles will roll from the assembly lines in Argentina in January.

The Argentine government has approved manufacture of Ramblers by Industrias Kaiser Argentina. Production fixtures and machines are being shipped from the American Motors Corp. Kenosha, Wis. plant for installation in the Cordoba plant.

American Motors is investing $3.5 million in the Argentine venture. Export sales of Ramblers this year are topping 1960 figures by 71 pct, according to George Romney, American Motors president.

Industrias Kaiser Argentina has been operating since 1955. It turns out Willys utility vehicles and Renault Dauphine cars at a rate of 4000-per-month.

Japanese Look To Iron Ore Needs

Japanese steelmakers are getting ready to import 48 million tons of iron ore in 1970. That's the same as Japan's crude steel production target.

To meet this need, Japan will turn to new sources. Africa, South America and India are expected to supply 10 million tons of ore each. The rest will come from old Southeast Asia sources, such as the Philippines and Goa.

New Japanese ore carriers will be built to carry the bigger loads. They will range between the present maximum of 45,000 tons and up to 100,000 tons.

Working Too Fast Brings Union Fine

"Working too hard" cost five UAW members fines of from $100 to $195 levied by the union at Bendix-Westinghouse Automotive Air Brake Co.

The charges stemmed from a slowdown ordered by the union last August. The slowdown actually cut out work above a standard agreed to by the company and the union. Workers were paid extra for work in excess of the standard.

When the workers continued to produce above the level in defiance of the union order, they were charged with violating membership pledges.

The men were told they could donate the amount of the fine to charity.

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INDUSTRIAL BRIEFS

Final Phase — Continental-Diamond Fibre Corp., Newark, Del., is completing the last phases of a $6.5 million, three-year consolidation and modernization program.

Japanese Licensee — Mitsubishi Atomic Power Industries, Inc., Tokyo, will make nuclear reactors and auxiliary equipment under a license and technical assistance agreement announced by Westinghouse Electric International Co.

New Plant—National Appliance Co., has opened a new 30,000 sq ft plant in Cascade Industrial Park near Portland, Ore. The company makes scientific research equipment.

Texas Transaction—Dresser Industries, Inc., Dallas, has acquired M & H Valve and Fittings Co., Anniston, Ala., from the Walworth Co. M & H makes valves, hydrants and fittings for municipal water systems and valves for sprinkler systems and industrial purposes.

Name Change — American Steel Foundries has proposed to change its corporate name to AMSTED Industries, Inc. The old name would be preserved by its Transportation Equipment Div. and its Hammond Div. which would operate as American Steel Foundries, Inc. Stockholders will vote on the proposed changes next Jan. 23.

Expansion Program — Consolidated Electrodynamics Corp., a subsidiary of Bell & Howell Co., has completed a $500,000 expansion program at its Data Recorders Div., East Pasadena, Calif.

Changes Name — The Pressed Metal Institute has changed its name to the American Metal Stamping Assoc. Its headquarters will continue to be in Cleveland.

New Plant—Permco Metal Fabricators have opened a new plant in Lowellville, O. Products include steel guard rail, and Permco fallout shelters.

Epps Addition—A 7500 square foot addition has been made at the tube mill of Epps Industries, Inc., in Vernon, Calif.

Processing Center—General Electric Co.'s Computer Dept. at Phoenix, Ariz., plans to establish an Information Processing Center in Dallas to offer computing services to business and industry in Texas and the Southwest.

Division Purchase—Olivier Corp. of Chicago, a subsidiary of The White Motor Co., has purchased the crawler tractor business of Cletrac Corp. Inventories, engineering and designs, and tools were sold to Olivier but the Cleveland plant was retained by Cletrac.

Mill Moves—Riverside-Alloy Metal Div., H. K. Porter Co., will move its Prentiss Wire Mill from an old section of Holyoke, Mass., to a new industrial park in that city. The plant produces both ferrous and non-ferrous wire.

Doubles Plant—Chemical Contour Corp. has started an expansion program which will double the plant area of its Gardena, Calif., facility.

New Field—Altamil Corp. has purchased design and manufacturing rights to a heavy-duty coin-operated washer and companion dry cleaning machine. They will be produced at Neodesha, Kan.

Location Change — Handy and Harman, fabricators and refiners of precious metals, have moved from Providence, R. I., to 845 Waterman Ave., East Providence, R. I.

Research Contract — Westinghouse Electric Corp. has been awarded a $75,000 contract by the Aeronautical Systems Div. of Wright Patterson Air Force Base, Ohio. The study will concern power conversion.

PATMI President—G. E. Gregory has been elected president of the Power Actuated Tool Manufacturers' Institute, Inc. He is president of Gregory Industries, Inc., Lorain, Ohio.

ACIL Election—F. H. Wright, vice president of Lucius Pitkin, Inc., of New York City has been named president-elect of the American Council of Independent Laboratories.

Abrasive Source—Corundum Co. of Pasadena, Calif. has announced a new source of abrasives. It is natural emery (aluminum oxide) which Corundum will import from Naxos, Greece.

Readiness Testers—General Dynamics/Astronautics, San Diego, awarded a contract to Fleming Industries, Inc., Torrance, Calif., for units which will measure the readiness status of Atlas missile systems without danger of inadvertent ignition.

New Company — Intermetallic Products, Inc., has been established by Joseph Waldman & Sons for the manufacture of bismuth telluride and gallium arsenide compounds and cooling modules. Crystal Labs, Inc., of Riverton, N. J., was acquired to form the new company.

RIA Award—Standard Pressed Steel Co. of Jenkintown, Pa., received an award from the Research Institute of America for contributions furthering business research and stimulating the personal and professional growth of their people.

Expansion Program—Frank W. Egan & Co. of Somerville, N. J., has doubled its plant facilities with a $350,000 expansion program.

Foundation Chairman — L. S. Wilcoxson has been elected chairman of the Welding Research Council-Engineering Foundation. He is vice president of Babcock and Wilcox Co.'s Boiler Div.

Equipment Traders — A service division of Patterson Foundry and Machine Co., Process Equipment Trading Co., is now operating. It will serve chemical processing, paint and varnish, and ceramic industries.

the bargain basement . . . no place for bargains. It isn't often that a buyer finds more than his money's worth where every effort has been made to give him just a little less. The bargain basement is always downstairs . . . usually in more ways than one.

Keep this in mind the next time you are offered an opportunity to cut the manufacturing cost of one of your products by a "step down" to a substitute material. There is little to be gained, for example, by a switch from brass to simulated brass when a better Scovill Alloy . . . and a better application of it . . . may give you a real bargain in cost-savings rather than a precarious excursion into "cheaper" goods.

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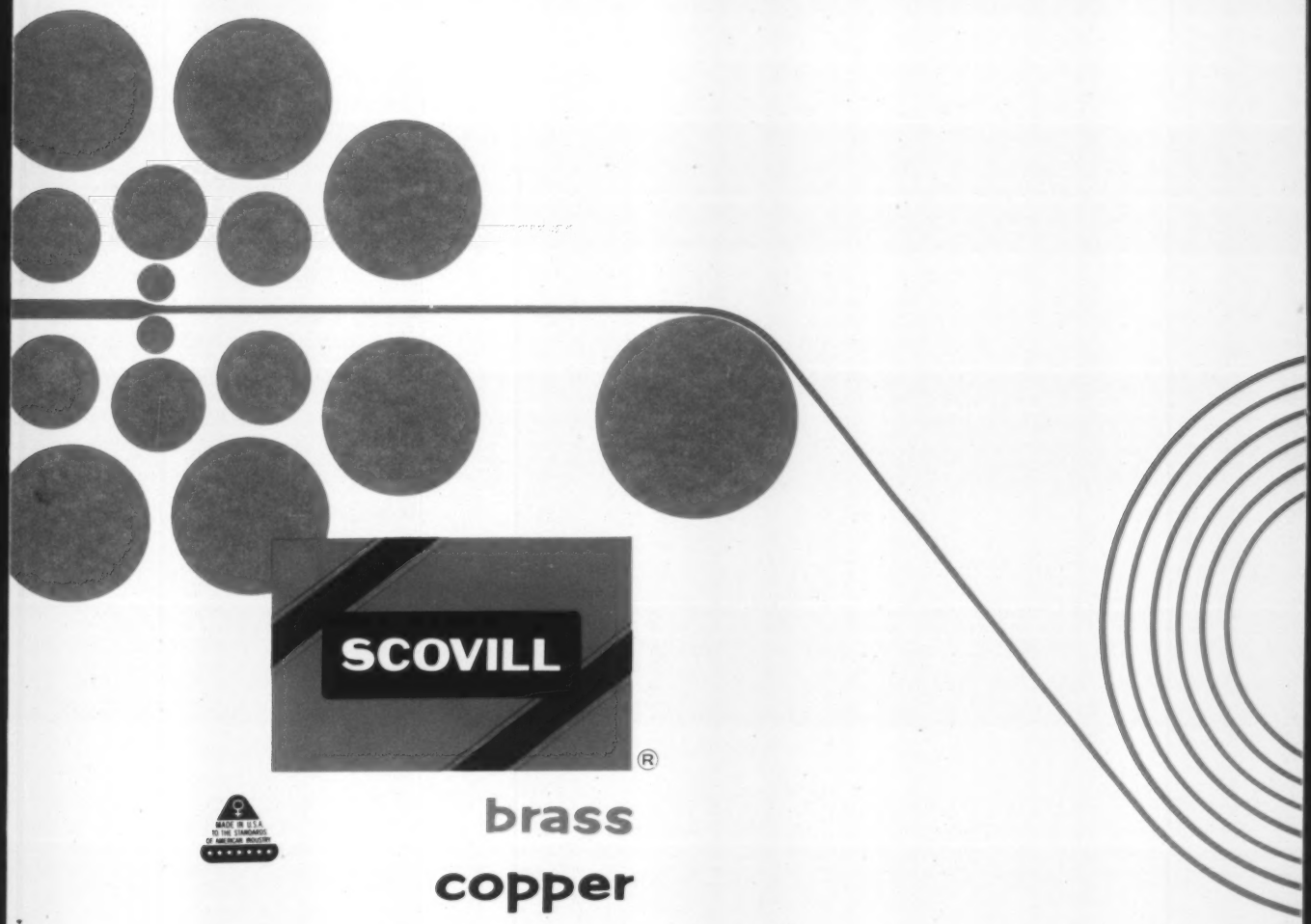

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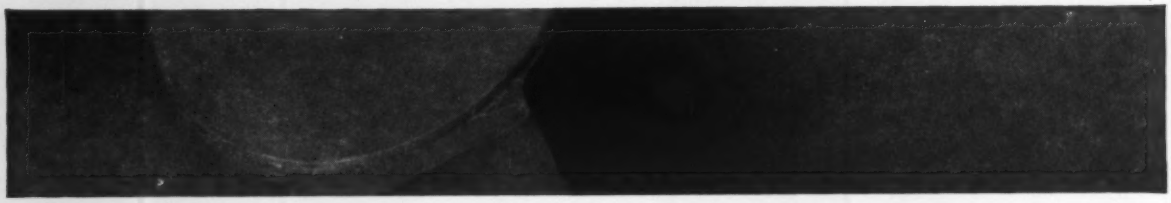
Simple changes save fastener $$



Value analysis of your current fastener practices by RB&W technical advisors can result in substantial cost reductions

Here are typical savings made possible through recommendations by RB&W fastener specialists...made after carefully analyzing product design and assembly upon request.

Manufactured product	Cost Reductions Made Possible
Automatic machine assemblies	$97,000 per year
Cooler-and-condenser units	$16,500 per year
Refrigeration units	$ 7,800 per year
Compressors	$12,000 per year

The striking thing about all these cost reductions is that they required merely a substitution to be realized ...a standard high strength bolt rather than a special alloy fastener ...a hex screw in place of a socket screw. No product design changes were involved.

How about a survey of your own fastening operations? Wherever fasteners are used in quantity, there are bound to be areas where you can shave costs simply by having assembly specifications altered. An RB&W fastener specialist, working with your engineers, can locate them for you. He's no smarter than your own people, but knows his specialty best and also what to look for. Write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

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117th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Sales office and warehouse at:** San Francisco, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas.

Are Managers Too Inflexible?

U. S. business managers have successfully used a wide variety of techniques.

But directing the new technological changes is a tough challenge. And present methods may hamper progress.

■ Does U. S. management lack bounce? Is it sometimes restricted by its own techniques?

Some recent studies have raised these questions. Usually it's agreed that U. S. managers know how to get things done. But there are some doubts about the system's flexibility.

Pressure — Inside and Out—Generally, the concern centers on methods of managing the present great technological changes. These, of course, place new demands on managers of research, production, and marketing.

U. S. management is also being compared with that of Russia—again with concern about technical direction. In a recent speech to members of the American Iron and Steel Institute, Herschel J. Brown, executive vice president, Lockheed Missiles & Space Co., touched on this theme.

Hard-hitting management of scientific and technical resources is vital if the U. S. is to win the technology race with the USSR, he notes.

System in the USSR—Russian success in such areas as manned space flight, Mr. Brown adds, is primarily due to their management. They have created an organization and made long-range plans to reach their national goals in science.

He recommends the U. S. focus scientific resources on national objectives, and "fill in bad gaps in our secondary schools and in engineering and scientific training."

But, Mr. Brown believes, U. S. management is equal to this challenge. He is convinced the nation "faces an all-out national effort in technology that will probably go on for many years."

Poor Technique?—Dale Yoder, professor at Stanford's Graduate School of Business, suggests some overemphasis on techniques not well grounded in theory has back-fired.

"Several current studies indicate managers should not haul their men in every six months or a year for a point-by-point summary of their strengths and weaknesses. Critical counseling may create resentment and conflict. Informal, day-to-day coaching may be a much better way of achieving the same ends."

Most employee communication, he says, is based on the idea that clear, accurate transmission of ideas is the clue to understanding. "But several reports show that careful transmission is not enough. Receivers may have left the phone off the hook. Courses in effective listening may be as valuable to executives as instruction in public speaking."

What Technical Leaders Need

■ The engineering manager is the key to successful technical direction. Engineers are the second largest group among corporate chief executives, according to Ogden Johnson, vice president of Ford, Bacon & Davis, Inc.

Work With People—"Yet," he adds, "the engineer's technical training often leaves him weak in interpersonal relationships and effective communication. To be a good executive, the engineer should have diplomacy, tact, and persuasiveness. This is essential if he is to work with people, understand their motives, and enlist their cooperation."

Engineering managers face a real challenge in keeping up-to-date on product and process technology, says George M. Muschamp, vice-president-engineering, Minneapolis-Honeywell Regulator Co.

How to Keep Ahead — Rapid product obsolescence and fast-moving technical developments impose new profit-making responsibilities on engineering management, he points out.

Mr. Muschamp suggests several ways the engineering manager can cope with the high rate of technological change. Included are:

Concentrating on acquiring new knowledge in his field. Preparing to meet increasingly rapid product obsolescence. Working more closely with sales to justify product development for minimum failure. Tightening coordination between design and industrial engineering for the profits needed to fund new programs. Making maximum use of automatic engineering aids.

Allison-Campbell

ABRASIVE CUTTING KNOW-HOW

This 12-inch billet was cut in 14 minutes!

This speed is standard procedure with CAMPBELL wet abrasive cutting machines. The 14-minute example refers to a semi-finished carbon steel billet, but it's just as true for other metals. Even Rene 41 and Inconel X can be cut at 7 to 10 square inches per minute.

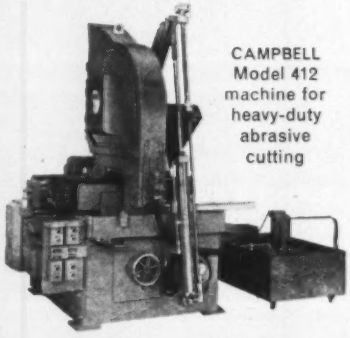
You get top quality, too • No burn, a surface suitable for metallurgical examination, and dimensional accuracy with modern abrasive cutting techniques.

The most economical way to cut • It's not uncommon to reduce cutting time from hours to mere minutes with CAMPBELL machines. Wheel cost is low, too.

Machines for heavy-duty jobs • ALLISON-CAMPBELL offers a wide selection of precision abrasive cutting machines. For the *big* jobs, the recommendation usually is either the CAMPBELL Model 481, with capacity up to 8" squares, or the CAMPBELL Model 412, which can cut 12" squares. Both of these machines have a unique coolant system for greater accuracy, better-quality cuts. Oscillation (the backward and forward motion of the wheel as it cuts through the work), speeds up production, increases wheel life.

For other cut-off jobs, there are four types of CAMPBELL machines in both wet and dry cutting models, with capacities and speeds to suit your own production needs. ALLISON-CAMPBELL also can supply the right wheels for any cut-off job.

Write for details. *For on-the-spot help, call in your* ALLISON-CAMPBELL *field engineer. He's an abrasive cutting specialist, ready to give expert advice.*



CAMPBELL Model 412 machine for heavy-duty abrasive cutting

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AC Ready With Anti-Smog Unit

California Law Will Demand Fume Catchers on Cars

So far, California has certified one crankcase fume unit. GM's AC Spark Plug Div. has it.

Solution of exhaust control problem needed to open up the market.

By A. E. Fleming

■ California is in a turmoil over anti-air pollution systems in cars.

The problem of finding a suitable and inexpensive way to get rid of crankcase fumes is about solved. But the stickler is getting a "fume catcher" or furnace that consumes unburned fuel that seeps into the exhaust area.

Automakers have been working on this exhaust project for about eight years. Whatever they've come up with so far has been unsatisfactory and costly, upwards of $100, because of the complexity of the devices and price of materials.

Unenforced Law—California has a law that would make air pollution control mandatory on its vehicles. But the law isn't being enforced because no crankcase or exhaust devices have been given the final okay.

However, the crankcase type device is well in hand. In fact, automakers have been voluntarily putting one on all cars built for sale in California since the 1961 model year. AC Spark Plug Div. of General Motors Corp. supplies them. Called Blowbys, they get rid of unburned gases which get past the piston and cylinder wall during the combustion cycle, by returning them from the crankcase to the intake manifold. Secretary of Health, Education and Welfare Ribicoff wants all new cars in the U. S. to have crankcase units by the 1964 model year.

AC's Blowby unit has been certified by the California Motor Vehicle Pollution Control Board. But certification is only a first step. Under Board regulation, at least two crankcase units and two exhaust units must be okayed. Then, a year after certification of at least two units in each category, installation on new cars would be required by law. So it will be more than a year before motorists must buy them.

Great Potential—There's a potential billion dollar market for the company or companies that can supply these control devices for the state's several million vehicles. If the move becomes national, the market potential would be multiplied many times.

AC's crankcase unit is competing with those of five other contenders whose applications have been accepted and whose units are under test.

The exhaust device is another matter. Out of 22 applicants, only one has even been accepted for testing. This is the Oxy-Catalyst Corp.'s high temperature catalytic converter.

Major Project — Events at AC Spark Plug prove how much is being spent on these projects. From the time the Division started in the Blowby program in the Fall of 1959 until early in 1961, more than 33,000 man hours were recorded by the Engineering Department alone.

AC has released for production and is currently tooled to make 100 different kits for installation of positive crankcase ventilation on current and older cars and trucks. More than 100,000 kits are stocked in Flint and there are enough parts in supply to assemble another 100,000. The Division estimates it has kits for about 70 pct of the American-built cars on the road.

In-Between Size Mercury

BIG OR SMALL? The Mercury Meteor is one answer to those who want a small car without giving an inch on big-car comfort. It's nine in. longer than the compact Comet, shorter than the Monterey.

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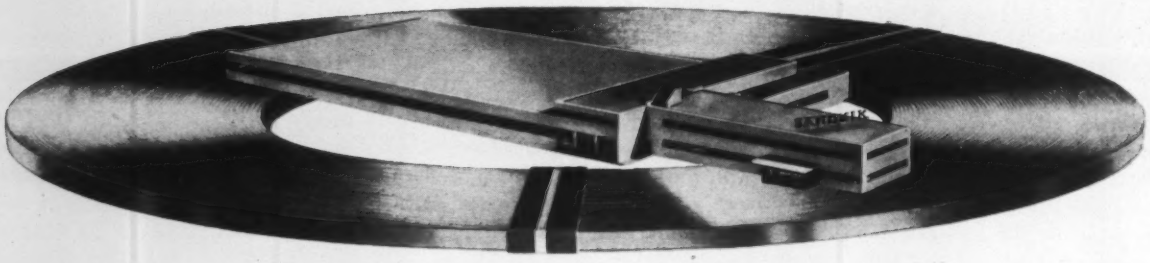

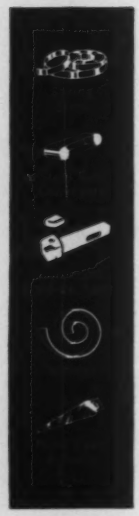

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California: A Quieter Boom

Metalworking Can Expect Growth Rate to Decrease

Forecast says the State will continue to enjoy growth, but at a slower pace.

California is expected to become most populous state within two years.
By R. R. Kay

■ August 3, 1963, is certain to be a historic date in the U. S.

Why? That's the day California will pass New York as the most populous state in the nation; so says its governor, Edmund G. "Pat" Brown.

For corporate planners, marketing men, and sales executives, "The California Economy: 1947-1980" is must reading.

The Inside Story—This study in depth shows what's behind all the big talk and hoopla about the soon-to-be most populous state.

California's growth will outpace the rest of the United States. But its rate will slow down.

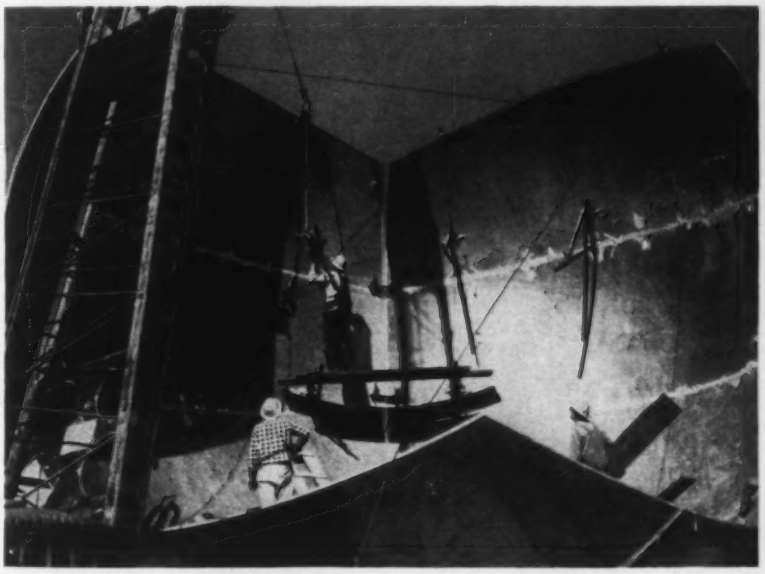
Population picture: 16.5 million today; 19 million by 1970; 24.7 million by 1980.

Employment Up — The report projects an average increase in employment during the 1960s of 126,300 persons per year. In the 1970s, 206,300 per year.

Here's how the figures look for the metalworking industry: a 57 pct hike by 1970; and 123 pct by 1980. Paychecks will go to 449,300 workers in 1970. And by 1980, the figure will zoom to 635,800.

These are just a few nuggets you'll find in the 450-page report by Stanford Research Institute.

Slow Growth—Why a slower rate of growth? Answer: It's not likely that a new basic industry with big boom possibilities will turn up. And if one does, it would have to be really spectacular to top the performance of the defense industry. There's none in sight.



SUPER-COLD STORAGE: Two tanks for the storage of liquid hydrogen have been fabricated by Chicago Bridge and Iron Co. Made of Kaiser aluminum, each will contain 90,000 gallons of the fuel which must be kept at ultra-low temperatures if it is to remain in the liquid state. The assembly at Sacramento, Calif., is for the Saturn S-IV rocket program which Douglas Aircraft is developing for the National Aeronautics and Space Admin.

California's growth in the 1960s will stem from: Production of goods formerly brought in from other areas; and changes in consumer demand that will favor the state's industries.

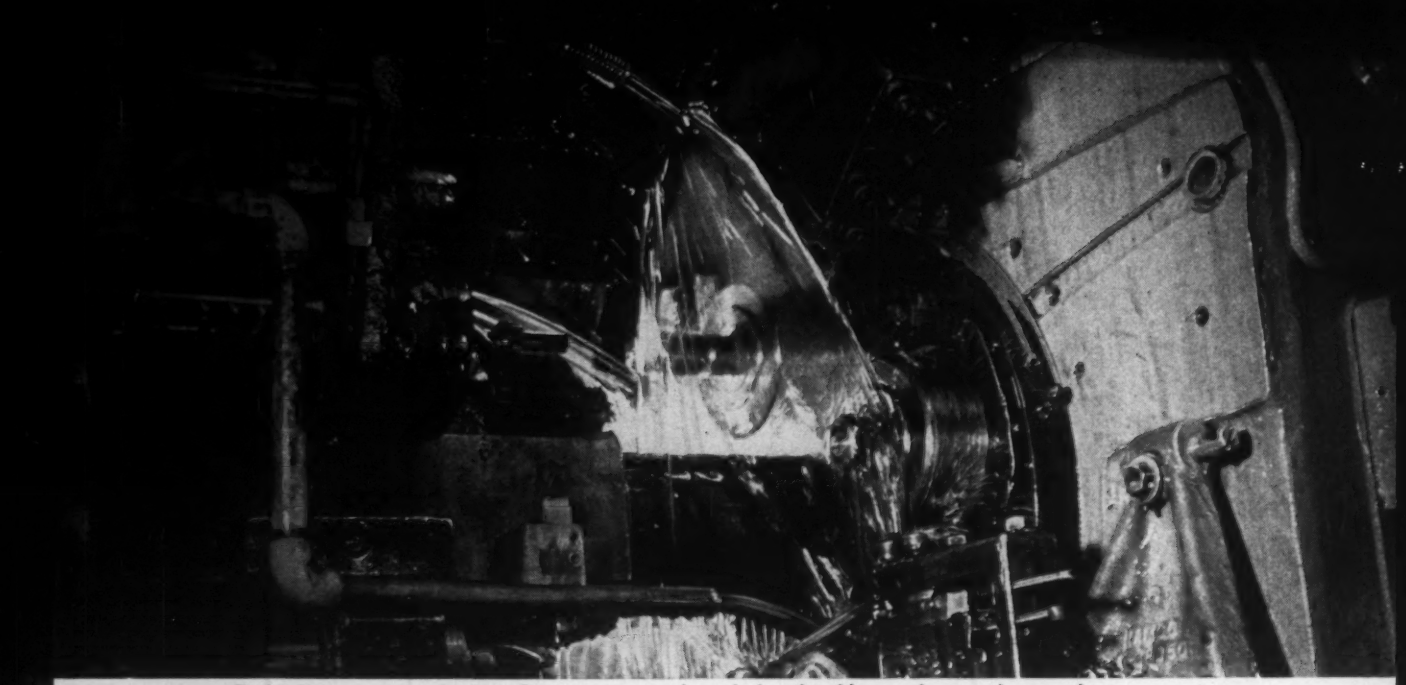
Other Advances—Big gains will also come in: Services, education, state and local government, wholesale and retail trades, and professional services.

Where will the hottest growth be? In the south: San Luis Obispo, Santa Barbara, and Ventura counties. Missile, electronic, and research and development firms will expand there. Vandenburg Air Force Base, Point Mugu, and Point Arguello test centers are close by.

Another hot spot is the Sacramento Valley. Behind this will be increased state government activities and new manufacturing plants.

L.A. to Boom—How about Los Angeles? It won't exactly stand still. The area will have the greatest absolute growth—some 60 pct of the State's total.

To get a copy of this report, write to Stanford Research Institute, Dept. 300, Menlo Park, California. The tab is $10.



Garia oils are completely clear. Operators can see through the oil and keep a close watch on machining operation.

CUTTING:

Shell puts heavy-duty properties into transparent cutting oils that lengthen tool life three significant ways

Today, Shell's new Garia® Oils are helping machine shops improve metal finish and prolong tool life—even in heavy-duty cutting. And because Garia is transparent, operators can see the work at all times.

Read how Shell Garia Oils can reduce rejects, cut maintenance and overhead costs in your shop.

UNTIL RECENTLY, most heavy-duty cutting oils were opaque fluids which obscured the work.

Shell scientists took up the problem. They experimented with different formulae until they found the *exact combination* that retained the necessary properties—but did not seriously darken the oil.

Now Shell Garia Oils have the transparency of light mineral oils and the rugged qualities of heavy-duty oils.

With Shell's improved Garia Oils, operators can see through the oil film. Work can be inspected more easily.

Garia Oils prolong tool life in three key ways:

1. Garia Oils help prevent metal pick-up. Shell Garia Oils form a more effective film between the work and the tool. This provides better anti-weld protection, and helps prevent metal pick-up on tools.

2. Garia Oils help keep work cooler. Even with high-speed cutting, the metal stays cool.

Cooling helps extend tool life, and helps assure a better finish on the work. Operating costs are lower too.

3. Garia Oils wet faster. They reach the tool point rapidly, cover newly exposed surfaces quickly.

Compact range

Today's range of Garia Oils covers every kind of metal cutting operation.

Result: you do not have to carry large cutting oil inventories. You can do more jobs with fewer Garia Oils.

For all the facts, see your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N. Y.

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry

Teaming Up for Foreign Sales

That's Amertool Services' Formula for Success

Operations of this export group, owned by 14 machine tool builders, are enlightening.

Sales to Japan appear especially promising.

■ In view of changing machine tool export trends, a look at the operations of a U. S. export group could be enlightening. The company, Amertool Services, Inc., is owned by 14 U. S. machine tool builders.

Set up in 1949, Amertool was the first to use U. S. Export-Import Bank revolving credit. Later, member firms put up more capital and Amertool opened lines of credit with U. S. commercial banks.

It has been extremely successful for two reasons: Nelson F. Caldwell, board chairman of Amertool, explains that the technical sales and service help it gives to its sales outlets is one key factor. The other is its ability to offer credit to potential buyers, promptly and in fairly large amounts.

PRESIDENT FINCH: "Japan looks like a fine machine tool market for at least three years."

CHAIRMAN CALDWELL: "Technical help, plus ability to finance, make the difference."

Avoids Europe—Mr. Caldwell, who is a vice-president of Cincinnati Milling and Grinding Machines, Inc., and export manager, Cincinnati Milling Machine Co., says that Amertool is active throughout Latin America, in Japan, Formosa and Korea. It no longer operates in Europe, where most member firms now have plants, joint-ventures or licensees.

Most Amertool engineers are nationals of the countries where they are based. None work in the U. S. At present, for instance, several Japanese are being trained in the plants of member firms. This usually means a one-year program, according to Amertool's president, Howard A. Finch.

Mr. Finch, who travels throughout the world for Amertool and for Jones & Lamson Machine Co., of which he is manager of marketing, is optimistic about the sales outlook in Japan "at least for the next three years." He says, "She's been buying a lot from us and we think that by then she'll be pretty well tooled up; her own builders will be playing a much bigger role by that time."

Impressive Sales — While Mr. Finch declined to discuss sales figures, Japanese sources suggest that they are impressive. They estimate that Toya Menka Kaisha, Ltd., Tokyo, which distributes for Amertool and others, chalked up sales of more than $500 million last year.

Amertool operates as an American company, except that it has no sales or technical staff in the U. S. Member companies are stockholders, each with a representative on the board.

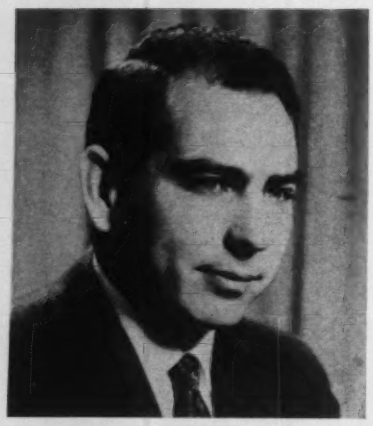
Numerical Control

During the next three months a number of seminars on numerical control will be held throughout the country.

The National Machine Tool Builders' Association and the American Machine Tool Distributors' Association will co-sponsor them.

The initial seminar will be held Dec. 4-5 in Los Angeles. Others will follow in San Francisco, St. Louis, Cleveland, Cincinnati, Chicago, Detroit, Philadelphia, Boston, Atlanta and Dallas.

MEN IN METALWORKING



C. E. Lamar, appointed, president, Southern Pipe Div., U. S. Industries, Inc.

A. H. Wirz, Inc.—R. F. Cox, appointed chairman of the board; T. C. Cox, Jr., named president.

Bell & Howell Co.—G. L. Chamberlin, elected vice president and treasurer.

Weinschel Engineering Co.—A. S. Clarke, elected to the board of directors.

Michigan Special Machine Co.—Jerome Sullivan, elected chairman of the board.

Webster Manufacturing, Inc.—H. A. Bernet, Jr., elected vice president, sales.

Air Reduction Co., Inc.—A. M. Andrews, Jr., appointed president, Airco Company International.

United States Steel Corp.—J. A. Neyenhouse, Jr., appointed general manager, strapping, U. S. Steel Supply; J. A. Murphy, Jr., appointed resident salesman in Columbus.

Aluminum Co. of America—J. C. Smith, named managing director, Alcoa of Australia Proprietary, Ltd.

Marquardt Corp.—S. E. Weaver, appointed vice president, engineering and marketing.

Westinghouse Electric Corp.—Dr. W. E. Johnson, named manager, atomic power dept.

Latrobe Steel Co.—J. W. Collier, appointed manager, production.

Thompson Ramo Wooldridge Inc.—W. C. Zehnpfennig, appointed manager, industrial control systems field engineering, Dage Div.

White Motor Co.—R. C. Wallace, appointed director, engineering, Lansing Div.

Tube Reducing Corp. — W. F. Martin, elected president.

Electric Autolite Co. — R. M. Burch, named director, automotive original equipment.

J. L. Burg, elected president, Burgmaster Corp.

Chrysler Corp.—Robert Anderson, elected vice president; A. G. Loofbourrow, elected vice president.

General Electric Co.—J. E. Pitman, named manager, marketing research and planning, communication products dept.

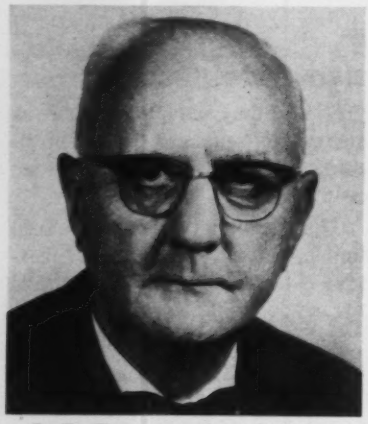
Hill Hubbell Co.—R. J. Young, elected president.

Rosedale Foundry and Machine Co.—P. H. Magnus, II, elected president; D. H. Ambrose, elected executive vice president.

Norton Co.—H. R. Montgomery, appointed manager, electric furnace plants, Abrasive Div.

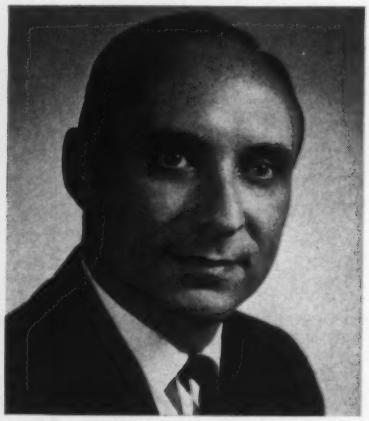
Kaiser Steel Corp.—W. R. Riggs, named asst. controller.

(Continued on P. 102)



L. D. Bowman, elected chairman of the board, Vanadium-Alloys Steel Co.

Dr. G. A. Roberts, named president and chief executive officer, Vanadium-Alloys Steel Co.

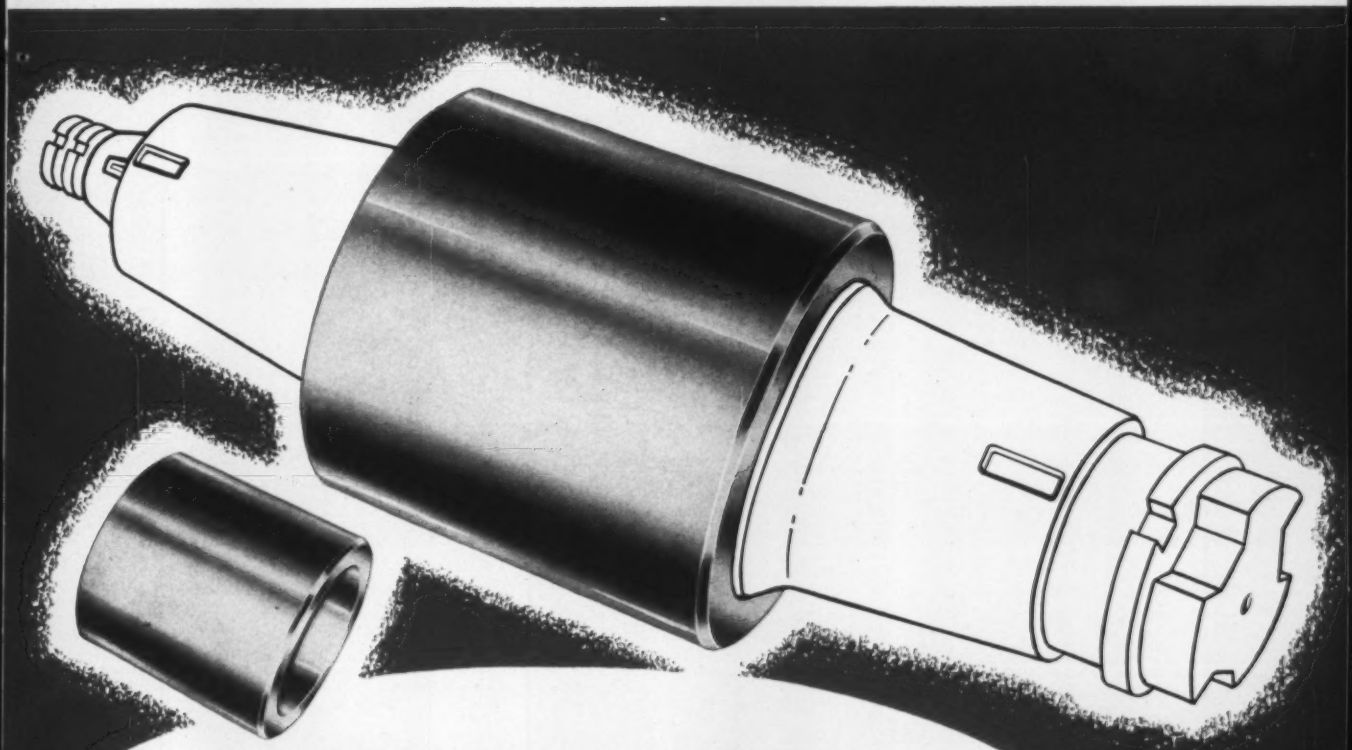


Dr. J. C. Hamaker, Jr., named vice president, technology, Vanadium-Alloys Steel Co.

Ohio

FORGED SLEEVES

and Cast Steel or Forged Steel Arbors for Back-Up Rolls



A Complete Back-Up Roll Service

Ohio Steel—specialists in manufacturing all types of iron, steel and forged steel rolls—now offers the rolling mill industry *a superior forged steel sleeve for back-up rolls.*

Ohio back-up roll body sleeves are forged and hardened from *balanced alloy vacuum poured degassed steel.* These sleeves are accurately machined and applied to either new or used forged steel or cast steel arbors.

Yes, Ohio Steel offers a complete back-up roll service. Ask your Ohio roll sales engineer about this modern facility that can help increase rolling mill efficiency.

THE OHIO STEEL FOUNDRY COMPANY
LIMA, OHIO

OHIO IRON and STEEL ROLLS

Carbon Steel Rolls	Flintuff Rolls	Denso Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

PLANTS AT LIMA AND SPRINGFIELD, OHIO. . *Virtually at the center of the Steel Industry*

OR-45

What the flatware story means to you

PHOTO BY ROBERT C. HOFFNER

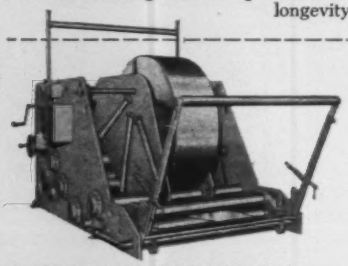
The elegance and exquisite beauty of Stainless Steel is steadily gaining in favor with the manufacturers of flatware. America's leading tableware craftsmen are specifying Sharon Stainless Steels more than ever. They find it easy to work with and like the natural patina it develops with age and use. In fact, they have found it to be the answer to the threat of foreign imports. For lasting durability, with an accent on product beauty, you'll be sure to find other manufacturers of high quality products also thinking Stainless Steels . . . and specifying them from the *Sharon Steel Corporation, Sharon, Pennsylvania.*

SHARON *Quality* **STEEL** SHARONSTEEL®

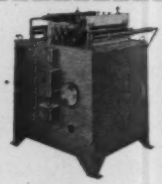
AMERICA'S FOREMOST PRODUCER OF LIGHT STEELS

improve pressroom performance *with a Low Cost* benchmaster

Benchmaster's reputation for pressroom equipment is built on *performance with economy!* Each machine meets all production requirements, possessing numerous features insuring ease of operation and longevity!



BENCHMASTER KOIL-KRADLES
Rotates coil stock on powered rollers, supplies a slack loop from which any machine can draw. Eliminates need of pulling against the weight of a heavy coil. Improves feeding speed and accuracy of parts. Sizes to 20,000 lb. capacity, 50" coil widths. Available with/without pinch rolls.



BENCHMASTER STRAIGHTENING MACHINES
Powered rolls remove moderate twist, curl and camber; flattens and straightens stock for easier feeding and better parts. Also available as COMBINATION STRAIGHTENING and FEEDING MACHINES or as KOIL-KRADLE STRAIGHTENER COMBINATIONS. Coil widths to 50", thicknesses depending on material specifications.

BENCHMASTER PUNCH PRESSES
Made in 2, 5, 8 and 10 ton capacities in plain OBI, Back-Geared, Fixed Bed Gap Frame, Deep Throat, Gang and Half-Press types for all high speed production requirements. Choice of air, electro-magnetic or mechanical clutches.

WRITE FOR FREE DESCRIPTIVE CIRCULARS!
Fully illustrated with complete specifications and features. Describe your operation for personal recommendations.

benchmaster
World's largest manufacturer of small punch presses and mills.

1835 West Rosecrans Avenue
Gardena, California

(Continued from p. 98)

Tubular Service Corp. — G. J. Davidse, appointed manager, engineering and statistics.

Michigan Tool Co.—R. W. Hallock, appointed manager, Enterprise Div.

Soule' Steel Co.—H. S. Anderson, appointed general manager, Commodity Products Div.; Robert Pearson, appointed product engineer, Commodity Products Div.

Seneca Falls Machine Co.—R. M. Wheeler, appointed manager, production and quality control; A. S. Dinsmore, named chief engineer.

General Motors Corp. — M. F. Rummel, named director, purchasing and production control; H. C. Jackson, named director, purchasing, and D. P. Duross, named production manager, Pontiac Motor Div.; L. H. Varblow, named asst. works manager in charge of all fabrication and assembly operations and A. J. Lore, named superintendent, methods and equipment, Cadillac Motor Car Div.; Dr. P. D. Agarwal, appointed technical specialist, land operations dept., Defense Systems Div.

Capehart Corp.—Leon Gleimer, appointed manager, design and development dept.

Hills-McCanna Co.—J. C. Hall, appointed special products manager; Rich Anderson, named Mid-Eastern regional sales manager.

F. C. Rabold, appointed asst. to president and manager, general services, Bethlehem Steel Co.

Litton Systems, Inc. — H. F. Erdley, named asst. general manager, Guidance and Control Systems Div.

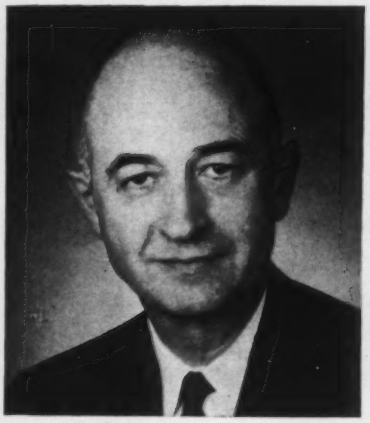
Wilkerson Corp.—J. D. Nosler, named manager, manufacturing.

Harnischfeger Corp. — S. G. Wells, named manager, Chicago district office, Welding Products Div.

Hughes Aircraft Co. — J. R. Weiner, appointed associated manager, Guidance and Controls Div.

Chase Brass & Copper Co.—G. R. Miller, named product manager, tube and fittings. (A subsidiary of Kennecott Copper Corp.)

Refractory & Insulation Corp.—Ray Hegeman, appointed asst. to the president.



J. M. Kimbrough, appointed asst. general manager, sales, Republic Steel Corp.

P. H. Pocock, named manager, sales, Sheet and Strip Div., Republic Steel Corp.

H. A. Sage, named manager, Can Machinery Plant, E. W. Bliss Co.

Republic Steel Corp.—J. D. West, appointed manager, land dept. for the Southern district; R. B. Watt, appointed manager, Southern Mines.

Standard Beryllium Corp.—M. M. Frank, elected vice president.

Acme Steel Co.—T. J. Fullerton, appointed director, New Products Development Div.

Dodge Manufacturing Corp.—R. K. Fuson, appointed administrative asst.

Allis - Chalmers Manufacturing Co.—Wainwright Holt, Jr., appointed manager, compressor sales.

Dayco Corp.—T. E. Farrell, appointed marketing manager, Rubber Products Div.; Leo Roth, named general manager, Dayton Rubber Co. (Canada) Ltd.

National Can Corp.—F. W. Considine, appointed general manager, sales.

Chicago Bridge & Iron Co.—R. W. Warren, appointed manager, sales, Germany, Holland and Italy.

Gemco, Inc.—C. L. Brockman, appointed director, engineering.

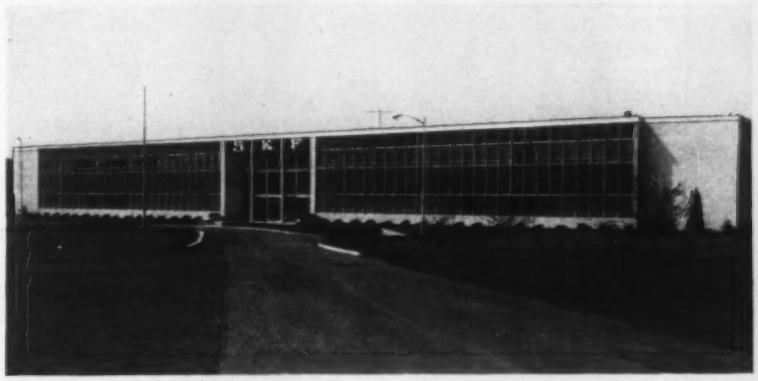
Beckman Instruments, Inc.—J. E. Tebay, appointed Eastern regional sales manager, process instruments, Scientific and Process Instruments Div.

Grove Valve and Regulator Co.—C. A. Redd, appointed product manager, valves.

SKF AND PENNSYLVANIA

KEYSTONE OF INDUSTRY

Another example of community-state cooperation in 100% FINANCING



SKF INDUSTRIES, INC.'S new plant addition at Altoona in Blair County—an ultramodern ball-bearing manufacturing facility—will employ 600 workers at full capacity, covers 110,820 square feet of plant and office space, and represents a total investment of 1½ million dollars.

Under this cooperative "100% Financing Plan," the Pennsylvania Industrial Development Authority granted a $450,000 loan; the 50% first mortgage was provided by a leading Pennsylvania bank; Altoona Enterprises, Incorporated (a local non-profit agency) financed $300,000.

LOANS = NEW PLANTS = NEW JOBS

A minimum 2% interest rate and a maximum 25-year term on state and local agency loans—50% of the total project cost.

In just over five years, the Pennsylvania Industrial Development Authority has made 183 project loans, totaling $22,234,480, to build or expand plants representing an investment of $67,985,618.

These new plants and expansions have created 30,438 jobs, with estimated annual payrolls of $111,918,495.

Get Full Details Now!

The "Pennsylvania Plan" offers complete financing on lease or lease-purchase arrangements. Hand-pick the type of community that best meets your location requirements; choose from plant "shells" now ready for completion to your specifications. Over 150 Pennsylvania community development groups have funds and a record of proven experience in all phases of industrial location and financing.

Investigate the potentials of a Pennsylvania plant location now! Write for:

- Facts on "100% Financing For Your New Plant in Pennsylvania"
- Full details on Pennsylvania's equitable "Tax Climate"
- "Plant Location Services" brochure
- Current listing of available industrial buildings and sites
- Special reports and tabulations, tailored to your specific location requirements, covering—Labor, Markets, Transportation, Materials, Minerals, Water, Power, Fuel, Engineering Facilities, Taxes and Community Data

PENNSYLVANIA PLANT LOCATION FACTORS

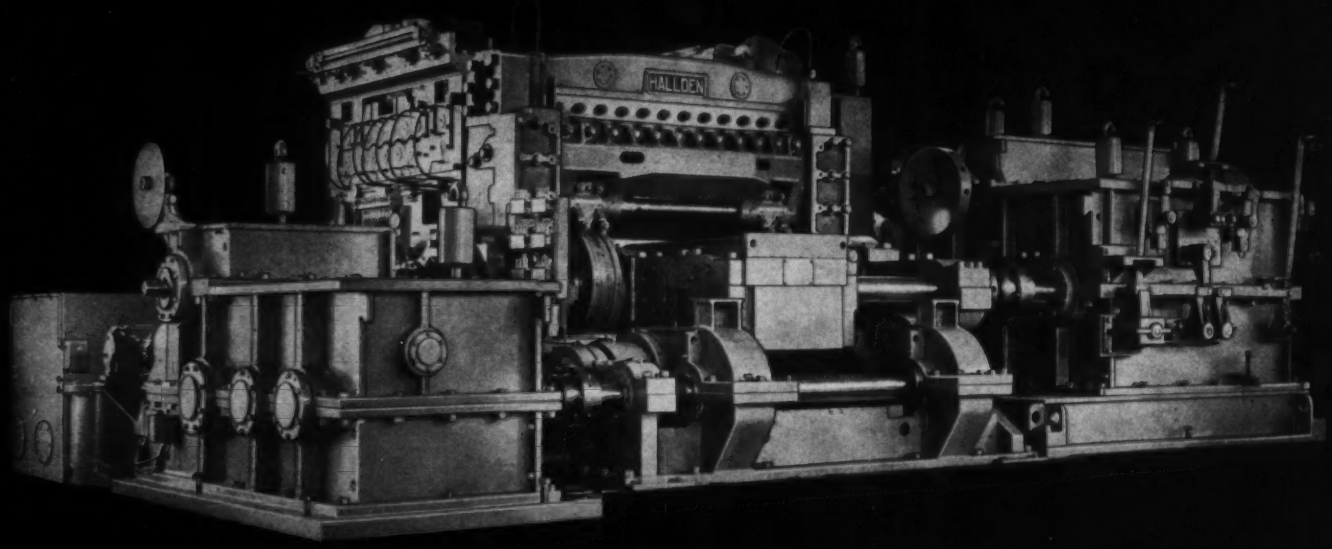
ADDRESS INQUIRIES TO:

PENNSYLVANIA DEPARTMENT OF COMMERCE

DIRECTOR OF INDUSTRIAL DEVELOPMENT

Room 436 • South Office Building • Harrisburg, Pennsylvania

Phone: CEdar 4-2912



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Specified throughout the world for the most modern high speed processing lines

Hallden Flying Shears are built in a wide range of designs and sizes to meet any strip shearing requirement from tin plate to 5/8" plate. Length of cut ranges from 12 inches up to 48 feet. Synchronization adjustment "on the fly" available. These rugged units have been proven on steel, aluminum and brass strip in cut-up, galvanizing and special process lines for nearly 40 years. For all high production strip shearing consult Hallden, The Shearing Specialists.

HALLDEN

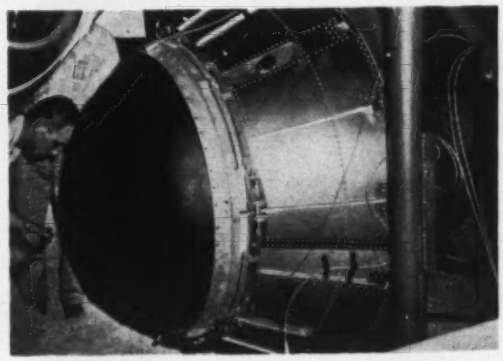
The world's leading machinery manufacturers rely on Hallden shears in their process lines

THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co., Ltd., Bedford, England

Canister Carries ECHO A-12

This magnesium canister will house a 500-lb plastic and aluminum-foil laminate balloon. NASA expects to launch the 135-ft diam sphere early in '62. Called Echo A-12, it will be the second phase of the communications satellite R & D program. The canister is being subjected to structural stresses to see just what it will take.



ANOTHER ECHO: Ready to go.

Mercury Powers New Engine

One of the most promising deep-space rocket engines is an electrostatic type. While research has centered on cesium and cesium-tungsten ion engines, the highest thrust efficiency obtained thus far is with the electrostatic units. Designed by NASA's Lewis Research Center, the engines use mercury as the propellent, and employ electron bombardment ionization.

Welds Interest Air Force

A program supported by the Air Force is underway at GE. Plan is to investigate the physical metallurgy of joining tungsten and columbium. The work includes studies of fusion welding tungsten and the brazing of columbium and tungsten. Electron-beam welds, made on powered-tungsten sheet, have a brittle to ductile bend transition temperature about 25°-50°C higher than that of recrystallized material.

NASA Recruits More Help

NASA has begun a nationwide drive to recruit 2000 scientists and engineers. The purpose: To pep up the U. S. space program. James E. Webb, NASA administrator, with President Kennedy's approval, will use these people to bolster many different staffs. These include the moonshot program, nuclear propulsion, space sciences and the supersonic transport study.

Glass Fibers Gain Ground

Steel and other high-strength alloys are indispensable to rocket making. But in such applications as motor cases for Minuteman and Polaris missiles, glass-reinforced plastics are gaining ground. The Defense Metals Information Center reports that continuous fibers have been produced from glass with a much higher strength-to-weight ratio than metals. An improvement in "Type E" commercial glass may lead to the development of a missile-grade glass.

Nations Discuss Weather

Meteorologists from 28 nations, including Russia, are meeting in Washington at a weather satellite workshop. Attendance by the Russians may indicate cooperation in satellite meteorology by the Soviet Union. The workshop, to foster international use of weather satellite information, is being conducted jointly by NASA and the U. S. Weather Bureau.

More Launch Sites To Come

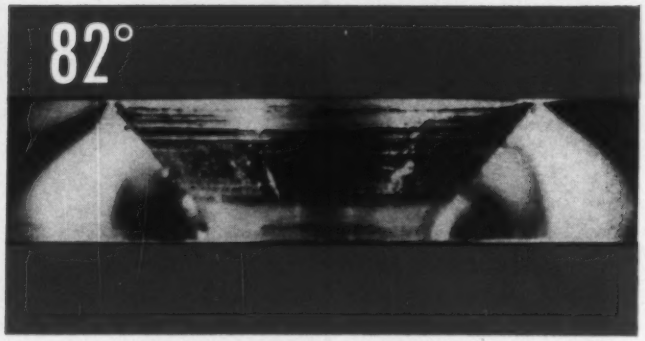
Space exploration is becoming a growing market for the U. S. construction industry. The government's space program has grown to a $500-million per year construction job. Industry will share construction jobs with agencies like the Army Corps of Engineers. Launching facilities, roads and buildings will continue to be in demand as the space program grows.

Cermets Protect Airframes

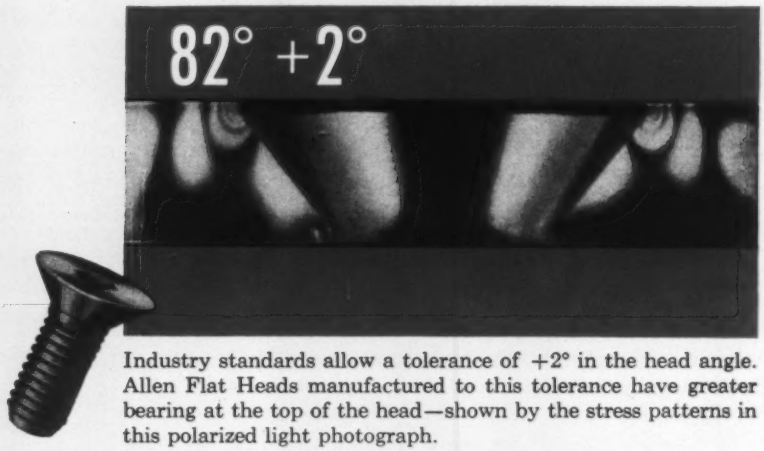
Scientists at American Machine & Foundry Co., moved a step closer to cladding airframe members against the high temperature created at hypersonic speeds. A five-mil coating of nickel-silicon oxide cermet, electrodeposited on molybdneum protects the metal against oxidation for more than 5 hours at 2500°F. A like coating of nickel-zirconium protects the moly for 468 hours at 2000°F. Goal is to protect the airframes for extended periods between 2500°-3300°F.

PQA* proves it...

this Allen Flat Head Cap Screw has complete all-around head contact

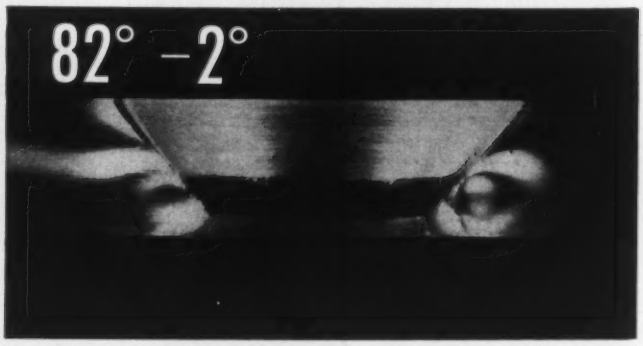


PQA makes it certain that an Allen Flat Head Cap Screw has contact throughout the angle of the head with the mating countersunk hole. This assures the strongest possible fastening. In this photo, made with polarized light, you can see the stress points throughout the chamfer.



Industry standards allow a tolerance of +2° in the head angle. Allen Flat Heads manufactured to this tolerance have greater bearing at the top of the head—shown by the stress patterns in this polarized light photograph.

*PRODUCT QUALITY ASSURANCE



Industry also allows a tolerance of −2° in the head angle. *But Allen does not utilize this negative tolerance.* The reason—it is entirely possible to have head seating efficiency reduced because of excessive interference in the head-shank area. The photo shows high bearing stress in this area—with risk of breaking prematurely.

PRODUCT QUALITY ASSURANCE is the symbol of unquestioned quality at ALLEN. It stands for *constant* quality control every step of the way—your guarantee of quality and reliability.

ALLEN

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Genuine ALLEN products are available only through your ALLEN Distributor. He maintains complete stocks close by to help cut your freight costs, inventory, warehousing and handling. He offers fast, single-source service. He knows ALLEN products. And he makes ALLEN Engineering Service available to you any time. Call him!

ALLEN HEX-SOCKET SCREWS HEAD

How Building-Block Automation Solves Handling Problems

Using a building-block concept, you can automate materials handling operations.

Even record keeping is automated with this new approach.

By **W. N. Redstreake**
Automation Editor

■ Every year, millions of dollars are spent to step up production capabilities. Much less money and attention go into the development of efficient materials handling methods. Yet materials handling and distribution often represent 30-50 pct of a product's total cost.

Automation of materials handling is a fertile field. Industry constantly strives to produce more and better products. As a result, a lot of effort goes into the automation of production processes.

However, increased productivity creates new problems. The biggest problem centers on materials handling. Once they're made, parts and finished products must be moved quickly and efficiently.

Keep 'Em Moving—In most plants, there's a gap between optimum productivity and minimum product cost. This gap isn't closing as fast as it should. Whenever output exceeds distribution levels, efficiency in both areas tumbles. Handling bottlenecks often thwart the most modern production lines.

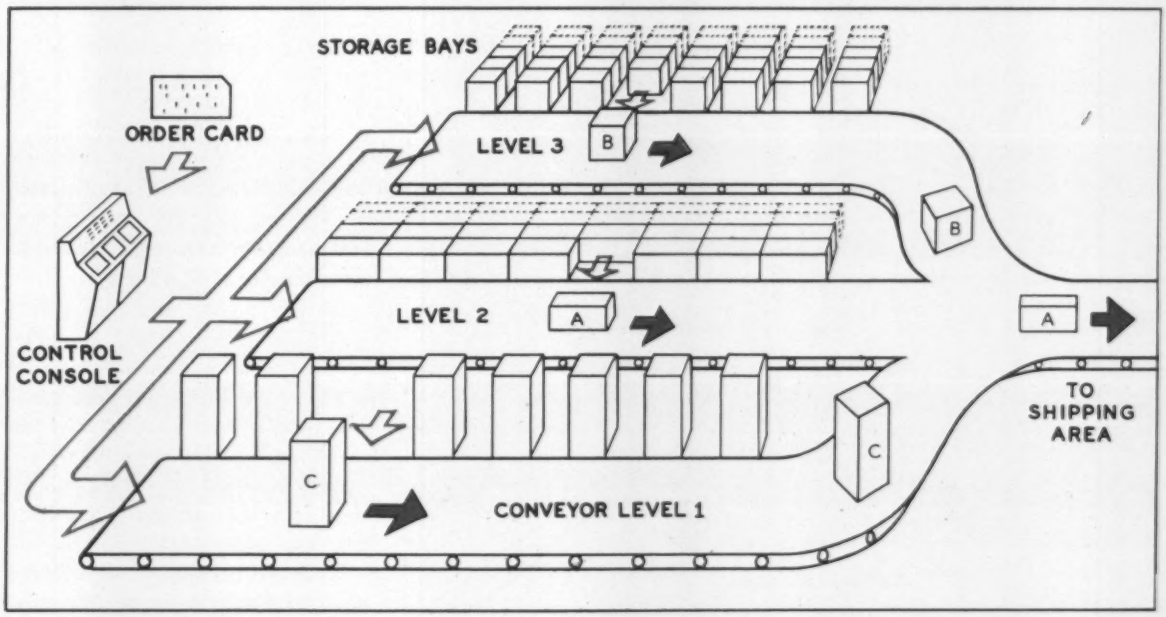
Many plants have special handling problems. Perhaps your workflow pattern may even be unique. Nevertheless, it can be automated.

General Electric Co., realizing this, decided to tackle the problem head-on. GE's Specialty Control Dept., Waynesboro, Va., proved the point by developing a complete line of automated material control (AMC) systems.

Start Small—Designed with a building-block approach, each AMC system can be expanded, integrated or modified into a more complete system. This allows complete automation of all handling operations. And you may even move slowly by buying this automation on a point-to-point basis.

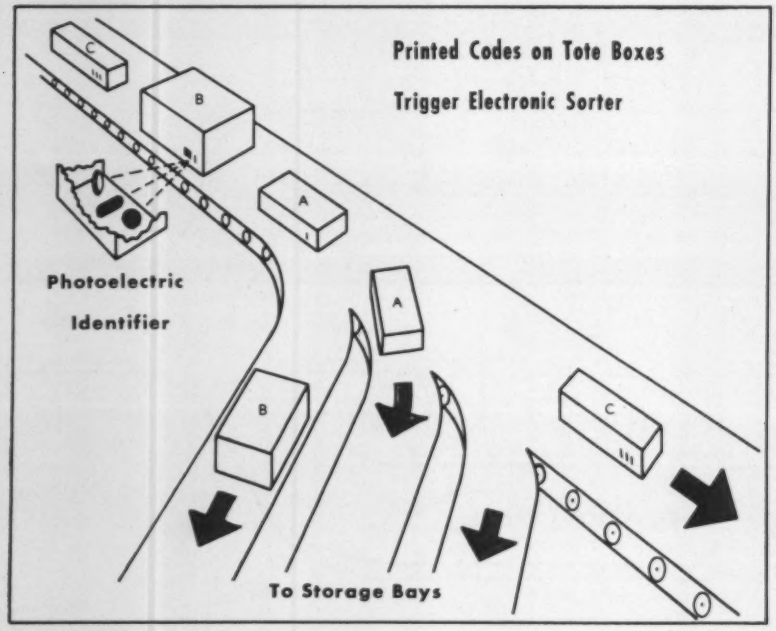
Every AMC system has two basic elements. The mechanical portion of the system consists of gravity-fed storage lanes and power-driven conveyors. This part of the system is

Handling System Keeps Its Own Records



SIMPLIFIED CIRCUITRY: There are only four different types of circuit boards in the system. This insures easy access and maintenance.

Sorting Device Is Automatic



built by handling-equipment manufacturers.

The control elements, on the other hand, are the key to full automation. In essence, they include a control console with a card reader, a magnetics control cabinet and photoelectric relays.

Each system can be tailored to suit individual needs. Variable conditions in productivity, product mix, order mix, number of items, number of orders and storage lanes per item present no problems.

Five Functions—Any or all of five basic functions can be automated. These functions are identification, dispatching, storage, recall and delivery. Paperwork and data processing for each function are also automatically tabulated.

Let's run through the automation of each function. We'll start with the identification stage. Photoelectric devices identify and sort the items entering storage. Printed codes on the cartons or tote boxes trigger these sensing devices.

As the items enter storage, other electrical sensors pinpoint physical characteristics such as weight and color. Simple counters can also be employed in the identification area to record quantities.

Manual Coding—In some AMC systems, items will be manually identified by an operator. He'll push buttons on a keyboard to log identity data.

These identity records later serve in other areas of the system. They're used to sort and direct items to pre-selected locations. During this dispatching function, the system automatically computes available storage space.

In the storage area, the automated handling system regulates flow on a first-in, first-out basis. It signals when maximum and minimum stock levels are reached. It also compiles an up-to-the-minute inventory record by adding or subtracting counts whenever an item enters or leaves storage.

The fourth function of a completely-automated system is the most

complex. Here's how this item-recall function operates.

Order Picking—Customer orders are punched on cards or programmed into a manual keyboard. The control unit accepts this information and transmits it to a shift register.

A counter controls the entry of each item's location into the shift register. The number of times the information is entered equals the quantity desired. All of this information shifts in synchronism with the conveyor.

When an item's location in one of the shift-register stages coincides with that item's storage lane, a release gate opens. This lets a carton or tote box enter the take-away conveyors.

Items on the take-away conveyors automatically merge in a fixed relationship on a single delivery conveyor. Punched cards or the manually-programmed orders set up each sequenced relationship.

Out of Stock—The cycle is repeated until all the data on the cards have been read. Subsequent orders follow immediately. Thus, the delivery conveyor is always full. A printed readout monitors all shortages whenever a storage lane becomes empty.

Automatic full-conveyor order picking offers the most outstanding benefits of all the systems in the new line. Cost is a paramount factor among these benefits.

A free-standing control console houses all memory and control circuits. Plug-in modules insure economy from a spare-parts viewpoint.

There's no wasted space on the main conveyor. All cartons or tote boxes are picked and placed on the conveyors in a regular pattern. Thus, a constant flow is maintained to the shipping area. Also, since the cartons come through at fixed intervals, you can accurately predict daily-output totals.

Odd-Ball Items — Some items don't warrant an automatic picking lane. Complete orders of manually-picked items can be made up in advance and placed in a separate lane. The control integrates the release of these hand-picked items to mesh with the automatically-programmed orders.

How can you start an AMC program? First, pin down your objectives. Are you aiming at lower handling costs, reduced inventory, or faster service on customer orders? If you hope to achieve all three, you're in the market for the whole GE package.

Next, make a study of your business operations. How many items are handled per hour or per day? How many different items are stocked? Do some require special handling?

Knowledge of these facts will help you decide which of your materials handling operations can be automated to best advantage. Your own engineers can probably handle this initial study and planning.

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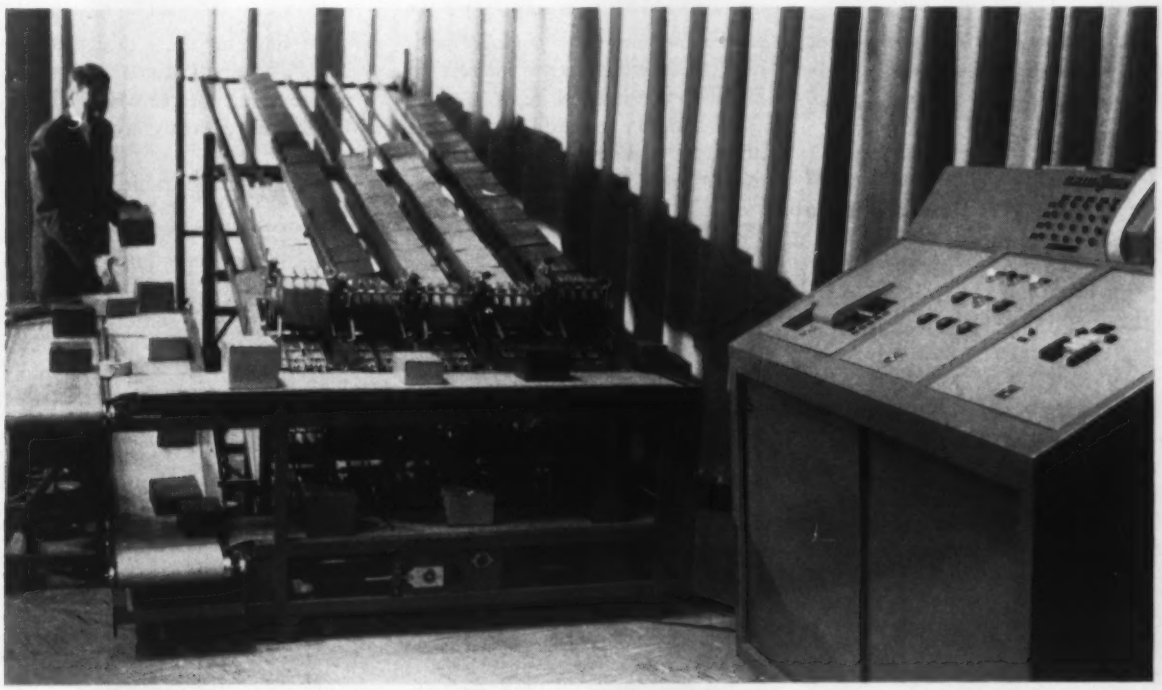


COMPACT SYSTEM: Demonstration model of the full-conveyor order-picking system includes 80-lane control console (right) which houses all control components. User announcements are expected shortly.

PREPARES TENSILES: Technician at Vanadium-Alloys Steel Co. prepares specimens of maraging steels.

Maraging Steels Gain Favor

A number of steel companies are showing active interest in Inco's new family of high-nickel, maraging steels.

What are the key features of the new alloys? How are these properties obtained?

▪ Interest in the new, high-nickel (18-25 pct) maraging steels, discovered and developed by the International Nickel Co., Inc., is gaining momentum.

The maraging discovery, made at the company's Bayonne, N. J. research lab, paves the way for a new family of steels with unmatched toughness at high strength levels.

Make Pilot Heats — Four steel companies are now making pilot heats; Vanadium-Alloys Steel Co., for example, recently announced an 18-pct nickel composition. It's called VascoMax 250. Five other steel companies are reportedly making or showing active interest in making experimental heats.

In addition to the 18-pct nickel alloy, the new alloy family includes 20-pct and 25-pct nickel compositions. Each advances design possibilities for applications which involve extreme pressure and stress. Missiles and aircraft are some examples.

Among the desirable traits are:

Nickel Is Vital Ingredient

	Composition, pct		
	18-pct Nickel	20-pct Nickel	25-pct Nickel
Nickel	17-19	18-20	25.0-26
Cobalt	7-8.5	—	—
Molybdenum	4.6-5.1	—	—
Titanium	0.3-0.5	1.3-1.6	1.3-1.6
Aluminum	0.05-0.15	0.15-0.35	0.15-0.35
Columbium	—	0.3-0.6	0.3-0.6
Carbon	0.03 max	0.03 max	0.03 max
Manganese	0.10 max	0.15 max	0.15 max
Silicon	0.10 max	0.15 max	0.15 max
Sulfur	0.01 max	0.01 max	0.01 max
Phosphorous	0.01 max	0.01 max	0.01 max
Boron	0.003 added	0.003 added	0.003 added
Zirconium	0.02 added	0.02 added	0.02 added
Calcium	0.05 added	0.05 added	0.05 added

What Are The Key Properties?

	18-pct Nickel		20-pct Nickel		25-pct Nickel	
	Annealed[1]	Maraged[2]	Annealed[1]	Maraged[3]	Annealed[1]	Maraged[4]
Hardness, Rc	28-30	50-52	26	—	10-15	—
Yield Strength, psi (0.2 pct offset)	95,000 psi	240,000-268,000	115,350	243,000-252,000	40,000	240,000 270,000
Tensile strength, psi	140,000	250,000-275,000	152,550	255,000-270,000	132,000	260,000-290,000
Elongation (1 in.), pct	17	10-12	8*	12	30	10-15
Reduction of area, pct	75	48-58	—	57-59	72	40-60
Notched tensile strength pct. (0.3-in. bar, Kt> 10)		372,000-386,000		353,000-362,000		280,000-360,000

[1] Anneal at 1500 ±50°F for 1 hr/in. thickness and air-cool
[2] Age at 900 ±25°F for 3 hr
[3] Age at 850°F for 4 hr or 900°F for 1 hr
[4] Heat at 1300°F for 4 hr and air cool
Refrigerate at —100°F for several hours
Age at 800-900°F for 1-4 hr and air cool

or
Anneal at 1500°F and air cool
Cold work (25 pct reduction or more)
Refrigerate at —100°F
Age at 800-900°F for 1-4 hr and air cool
* Elongation in 2 in.

Useful yield strengths up to 250,000 psi; high ductility and toughness; good stress corrosion in salt water and industrial atmospheres; nil ductility temperature of the 18-pct nickel steel is —80°F.

Key to Properties—Maraging is the key to the excellent properties developed by the new alloy family. It involves the age hardening of martensite. The table of properties includes the proper heat treating cycles.

The maraging treatment is noteworthy because of its extreme simplicity, points out International Nickel. Consider the 18-pct nickel alloy, for example.

With proper finishing temperature off the mill, followed by air cooling to room temperature, the treatment consists merely of holding at about 900°F for about three hours and air cooling.

Solution annealing at 1500°F before maraging is optional. Quenching is not required; full properties can be developed in heavy sections with no distortion problems. However, it's recommended that the higher nickel steels be annealed after hot working, prior to aging.

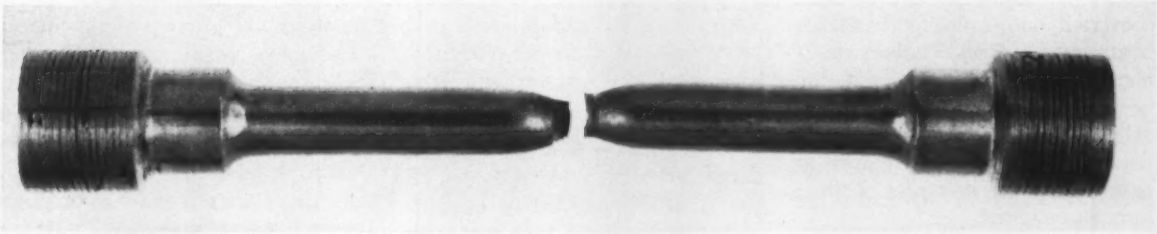
Forging and Rolling—Workability, both hot and cold, is very good. Hot working can be accomplished by standard forging and rolling techniques. Starting temperatures are as high as 2300°F. Finishing is about 1700°F for the 18-pct nickel composition, about 1500°F for the 20-pct and 25-pct nickel alloys. For optimum results, when working the latter two alloys, about 25-pct final reduction should be made at the finishing temperature.

Cold working, after annealing, and followed by aging, provides decided improvements in tensile and notch strengths. This is one of the key features of the new steels.

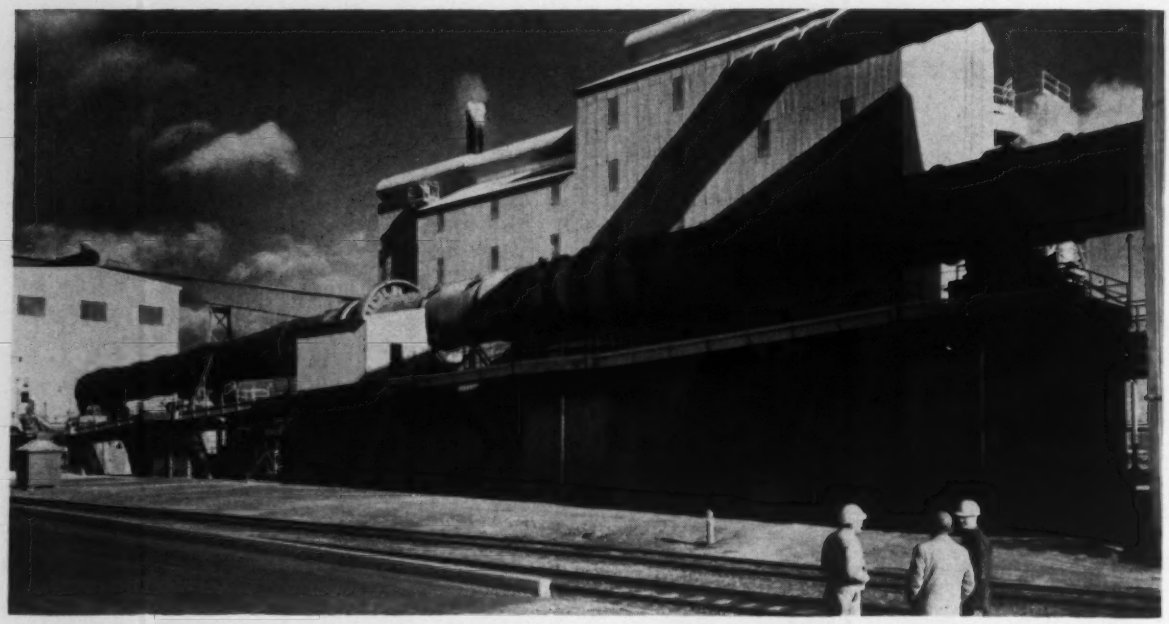
No Preheating—Maraging steels are weldable in the fully heat-treated condition without preheating. They need only a post-weld aging treatment to fully restore properties in the heat-affected zone.

The 18-pct nickel steel can be welded by either manual or automatic methods, says International Nickel. Sound welds can be made in the 20-pct and 25-pct nickel alloys by using coated-electrode, inert-gas, consumable-electrode or tungsten-arc techniques.

How About Machinability?—The 18-pct composition, such as Vasco-Max 250, has good machinability even in the fully aged condition. The 20-pct composition? Limited machining is feasible in the fully heat treated condition. The 25-pct composition? Rough machining is possible in the annealed condition or before final aging. After aging, light finish machining is feasible.



GOOD DUCTILITY: "Necking" of high-tensile-strength (265,000 psi) specimen reveals good ductility.



KEY ROLE: Special process line at Harbison-Walker plant plays key role in making new refractory.

New High-Density Refractory Takes Higher Temperatures

Higher operating temperatures and longer furnace life are some advantages of a new high-purity refractory.

Key to its success is the manufacturing process.

■ Topping all its achievements in the development of high purity magnesite refractories, Harbison-Walker Refractories Co., Pittsburgh, has unveiled a magnesia refractory grain that is 98 pct pure.

The new grain has already been converted into a line of basic refractories. As E. A. Garber, chairman of the board, points out, the new high-purity refractory will enable steelmaking and other allied industries to operate furnaces at temperatures far in excess of those now encountered.

Potential Is High—Trial runs are being made in the field. For example, these new high purity brick are showing excellent results in more than a dozen openhearths, reports Harbison-Walker.

"The trials," according to Frank Shonkwiler, manager of basic sales, "have been in long enough for us to know that they are very promising. In fact, our experiences to date indicate the new products will be outstandingly successful. Results have been excellent in severe wear areas."

In addition to openhearth experience, successful service trials have been indicated in copper converters, glass tank regenerators and other applications.

New Tonnage Records—Another large potential field, according to R. E. Birch, director of research, is for basic-oxygen furnace linings. "Incorporating the new grain into these basic-oxygen refractory linings, we believe, will result in new tonnage records and longer campaigns."

For steel making, according to Harbison-Walker, the new brick will withstand temperatures in substantial excess of the present top limit of about 3200°F. In other commercial installations, brick made from the new refractory withstand temperatures well above 4000°F.

New Process Line — The secret behind the success of the new refractory is a new process line at Ludington, Mich., developed after many years of research. This process has now been perfected to a point where the new grain is being made in large tonnages.

What's more, end-use products from this high purity grain are now produced at various plants in large

quantities without moving the cost of refractories out of the present price range, claims Harbison-Walker.

"The big problem in developing the 98-pct grain material," explains R. E. Birch, "was how to achieve high purity without sacrificing density." Density is the key to structural stability and corrosion resistance at high temperatures.

Basic Steps—Briefly, the process involves taking magnesium hydroxide and bringing it down to a dense body of high purity through several pretreatment steps, briquet formation and finally a very hard burning at over 4000°F.

Previously, says Harbison-Walker, the very top purity for magnesia refractory was on the order of 96 pct.

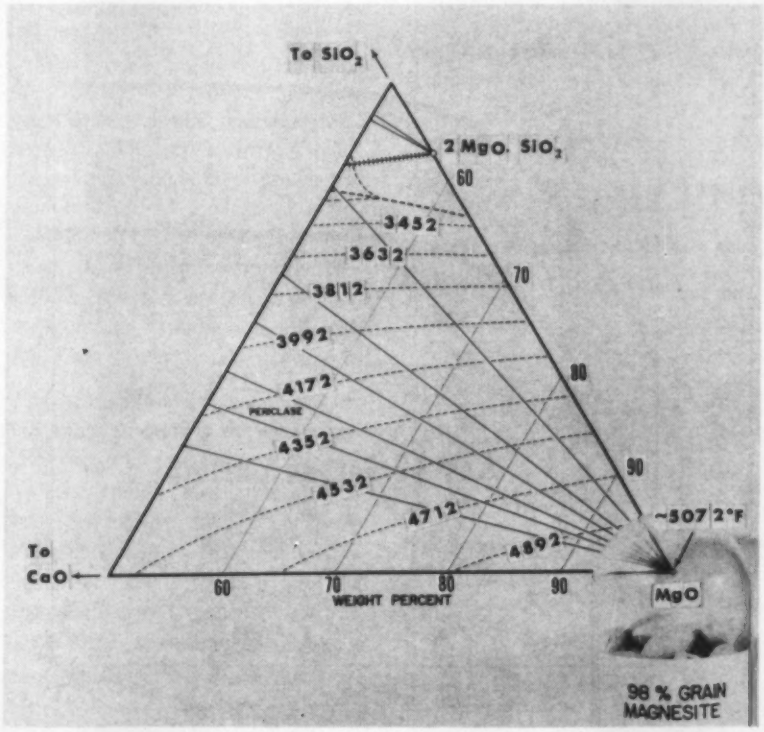
Consequently, improving the purity from 96 to 98 pct involves reducing impurities by 50 pct. Accomplishing this meant eliminating traditionally-used sintering agents.

READIES FINAL TREATMENT: Inspector checks top of vertical kiln in which high-purity, 98-pct magnesia refractory is deadburned.

No Sintering Agents—The use of sintering agents to densify high-purity materials in firing is a much practiced and highly developed art in various fields, points out Harbison-Walker. There are many patents in this field.

How to bring this material to a high density grain without sintering agents was the key to the process.

That this feat was accomplished is attested to by the new grain. It features a porosity under 7 pct. (Low porosity means high density.) Melting point is about 5000°F. Moreover, grain sizing is excellent for use in refractories manufacture; mineral crystallinity is well developed.



CLOSE APPROACH: New 98-pct grain refractory closely approaches MgO's melting point of 5072°F which tops that of most refractory oxides.

New Products — The first announced product made from 98 pct grain is Harklase, a brick that's hard fired in tunnel kilns for maximum density and strength.

Other refractories made from the grain are unfired and/or metal-encased for use in the openhearth, or in cement or lime-burning rotary kilns.

Still other types are being produced with special additions to provide the particular traits needed in glass, nonferrous metals, and chemical fields. There is also a line of monolithic products—castables, ramming and gunning mixes—based on the high-purity grain.

Novel Processes Add Integrity To Magnesium Castings

Higher strengths, less porosity —these are some of the aims of magnesium foundrymen.

Warm forming, pressure casting, and rotational solidification are some new approaches to these goals.

■ Magnesium experts are leaving no stone unturned in developing magnesium's technology.

Take warm forming, for example. This technique has garnered much interest in recent years as a means of obtaining high strengths in certain steels. One such process reportedly strengthens steels up to 500,000 psi. Can this same general technique be applied to nonferrous metals?

Novel Methods—Warm forming and other "novel" methods for strengthening and otherwise improving the integrity of magnesium alloys were discussed at the recent annual convention of the Magnesium Assoc., in New York. The speaker was T. Watmough of Armour Research Foundation.

A warm-forming technique, adopted at Armour, is to take an AZ92 casting in the solution-treated state and then press forge it. Forging temperature is at least 400°F.

Initial tests showed that deformations up to 20 pct give significant increases in strength. Note the first chart. Tests were run on blanks cut from a slab casting.

Test the Castings — "Applying this process to a full-scale casting was the next step," explained Mr. Watmough. "Then we could evaluate the load-bearing capacity of the press-forged casting with a normal casting."

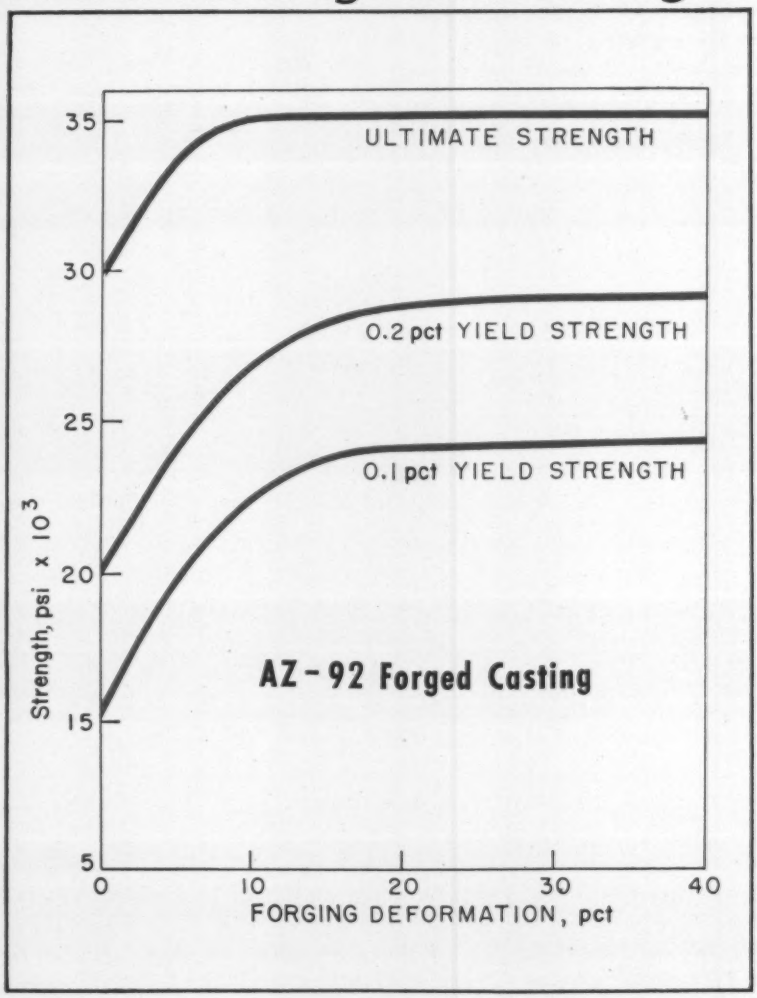
The casting selected was an aircraft elevator-control lever. It was redesigned to allow a 20 pct deformation and thus secure the property improvement shown by the test blocks.

The second chart points up the load bearing capabilities of the original casting, the redesigned casting and the press-forged casting. Note that the ability of the press-forged casting to sustain loads is considerably superior to that of the conventional castings.

Try Other Alloys—Warm working to improve properties of various magnesium-lithium alloys has also been studied at Armour Research Foundation. These alloys are of current interest for armor and missile applications. However, a slight difference in strengthening mechanisms exists; in these alloys, a precipitation mechanism occurs during deformation.

Variables studied were: Working

Warm Forming Hikes Strengths



temperature; the means of attaining this temperature; and the aging treatment after working.

The base alloy chosen for this work was Mg-13.5Li-1.5 Al. Optimum treatment for the alloys is as follows:

1. Primary ingot breakdown at 750°F.
2. Oil quench to room temperature.
3. Rapid reheating in oil to 400°F.
4. Press forge 50 pct as rapidly as possible to 2-in. plate.
5. Oil quench to room temperature.
6. Stabilize at 165°F to constant hardness.

Words of Caution—A series of 21 alloys were processed to 2-in. thick plate by the above treatment. There are two factors, though, that should be noted, Mr. Watmough cautioned the scientists at the Magnesium Assoc. convention.

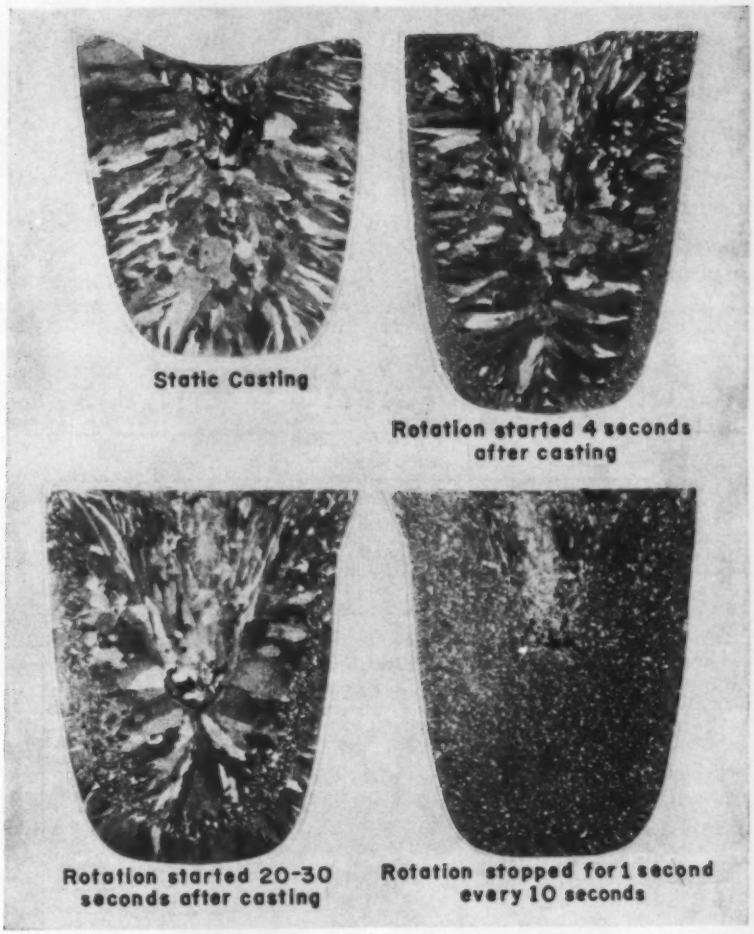
One concerns the susceptibility of these magnesium-lithium alloys to quench-cracking phenomenon. It's likely that a critical cooling rate exists, for various thicknesses, below 300°F, above which cracking will occur.

The second point concerns the effect of holding time at the optimum processing temperature—namely 400°F. Apparently, if holding time is too long, the tensile strength drops off.

Nonetheless, if proper procedures are used, worthwhile improvements in the mechanical properties of various light alloys can be obtained with this thermo-mechanical treatment.

Must Be Sound—When one plans to strengthen cast structures, it's usually assumed that these structures are sound and of fine grain size. If these desirable traits are not present, points out Mr. Watmough, little advantage will accrue from the strengthening techniques.

Achieving soundness in thick-section, light-alloy castings has been a problem for foundrymen for many years. A dispersed type of shrinkage and porosity often occurs.


Static Casting
Rotation started 4 seconds after casting
Rotation started 20-30 seconds after casting
Rotation stopped for 1 second every 10 seconds

WATCH THE GRAINS: Rotating castings during solidification gives finer grain size. Pouring temperature: 1600°F. Rotational speed: 250 rpm.

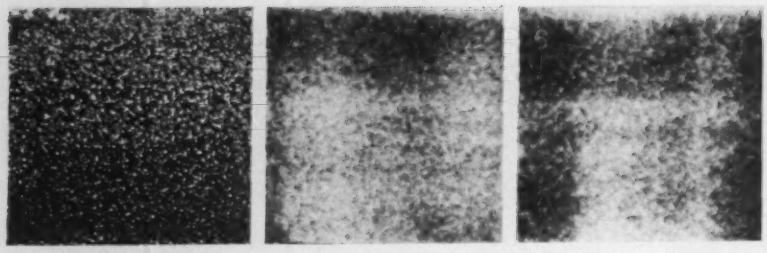
How Much Improvement?

Mechanical Properties of Magnesium Alloy AZ 92 and Aluminum Alloy 220

CONDITION	Ultimate tensile strength, psi	0.2 pct yield strength, psi	Elong., pct
		AZ 92	
As-cast	29,500	19,900	1.75
Press-forged 20 pct at 400 °F	35,000	28,700	1.75
(pct Change)	(+19.5)	(+43.0)	(0.0)
		Al 220	
As-cast	31,400	24,500	14
Press-forged 40 pct at room temperature	52,000	49,100	7
(pct Change)	(+65)	(+99.5)	(−50)

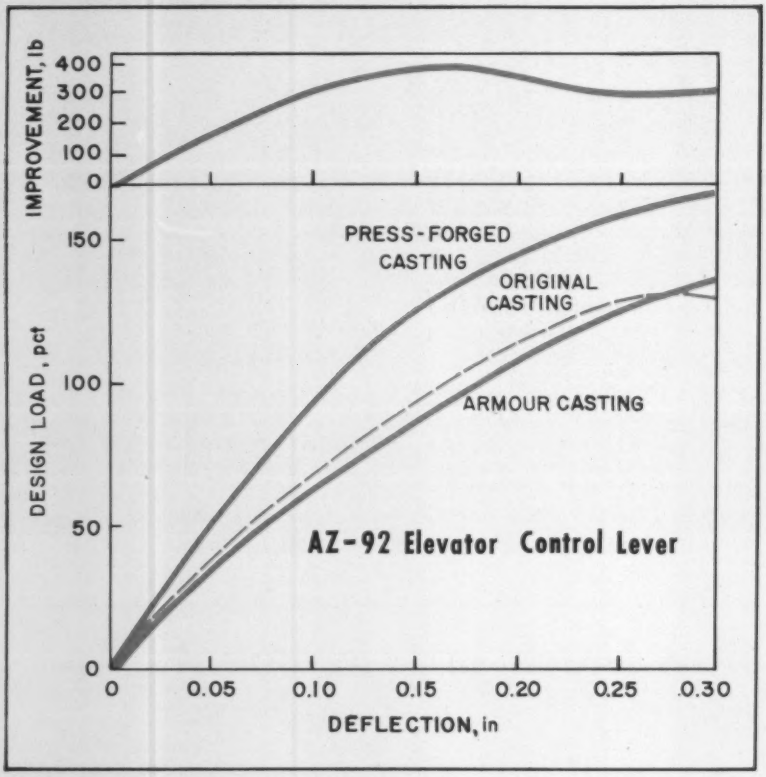
What causes this shrinkage? It depends on three factors. One is the intrinsic properties of the liquid metal. These include viscosity, surface energy relationships between the phases, and freezing range.

Second is local thermal conditions—both longitudinal and lateral temperature gradients. Third is pressure differential. This involves metal-



PRESSURE HELPS: Applying pressure to feeder heads of castings cuts down porosity. From left to right: 0 psi; 10 psi; 20 psi.

Forging: Aid to Mg Castings



lostatic head, applied pressure, if any, and mode of solidification.

Many of these factors are intrinsic to the metal and mold system, points out Mr. Watmough. They're not particularly easy to manipulate except perhaps with the use of chills.

Supplementary Pressure—However, there's another area open to exploration. It involves the application of supplementary pressure to feeder heads.

In this study at Armour, castings were purposely designed to have severe dispersed - shrinkage problems. Two different castings were used—one, 2 sq in. x 14 in. long; the other, 4 sq in. x 26 in. long.

If these castings are made of aluminum alloy No. 220 (containing 10 pct magnesium) and run and fed from one end, then shrinkage porosity will certainly occur, according to Mr. Watmough.

Shows Less Shrinkage—Two different pressures—10 psi and 20 psi —were applied to the feeder heads of the castings. Argon gas was used to provide the pressure.

To check the results of this technique to reduce porosity, ⅛-in. cross-section slices were machined from the test casting at 2-in. intervals.

Results of radiographic tests show that the supplementary pressure on the feeder heads of long freezing-range light alloys does indeed reduce interdendritic shrinkage.

Rotate for Fine Grains—Another approach to improving the integrity of castings and ingots was covered at the Magnesium Assoc. meeting. It has to do with achieving a fine grain structure throughout the casting or ingot.

The new technique is purely mechanical. It involves the interrupted rotation of metal while it is solidfying in the mold. This work was carried out under the direction of F. A. Crossley at Armour.

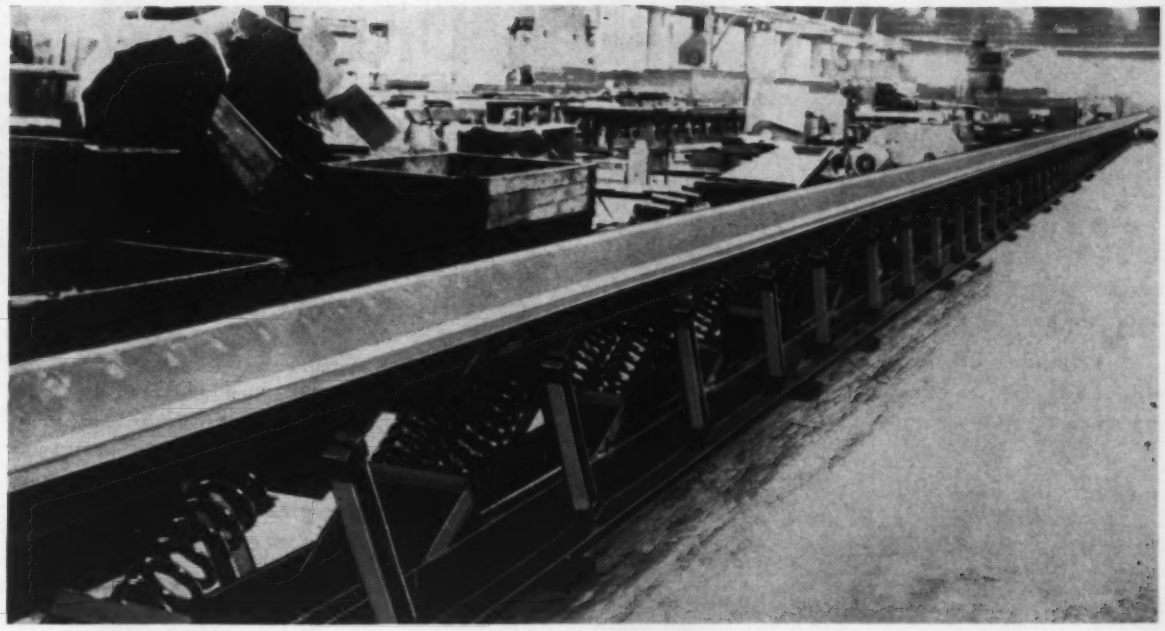
Cast on Turntable—Here's one experiment that illustrates the effect. Several five-lb pure-aluminum castings were cast on a turntable capable of rotating at 250 rpm.

Treatments involved were: Static casting (no rotations); rotation applied 4 seconds after casting; rotation applied 25 seconds after casting; rotation stopped for 1 second every 10 seconds.

What were the results? The photograph points up the effects of the various treatments. During the period of acceleration of the liquid, fine grain material results. When uniform rotation occurs, grain structure reverts to columnar type. When an interrupted rotation was applied (without permitting rotational equilibrium) the casting was fine-grained throughout.

It appears then, concludes Mr. Watmough, that there are several approaches for improving the strength and integrity of light alloy structures.

It's true that they still are in the research and development stage. However, there would seem to be some grounds for integrating them into certain phases of light-alloy practice.



LONG HAUL: The natural frequency of all the springs is the same. As they vibrate the trough, power is regenerated in the compression and extension strokes. This power then helps to start the next stroke.

Vibrator Varies Conveyor Speed

Coil springs are the key to a vibrating conveyor.

One company controls the springs actions to regulate conveyor capacity and speed.

■ Vibrating-type conveyors operate largely by reclaiming energy created by the natural frequency vibration of coil springs. To go a step further, the Stephens-Adamson Mfg., Co., Aurora, Ill., designed a new variable-stroke drive. It allows conveying speeds to be varied to meet work requirements.

Compare Works—"An excellent example of how these conveyors operate is found in the pendulum of a clock," explains Elmer Renner, Stephens-Adamson vice-president. "Once the pendulum starts to swing, it takes only a small amount of energy to keep it going."

When the coil springs of the conveyor start to vibrate at their natural frequency or resonance, they regenerate much of their own power. The added power is supplied through a variable-stroke positive-eccentric drive. It also controls material flow regardless of the load placed on the conveyor.

How Feeds Change—Let's take a closer look at the drive unit. Basically, an eccentric is machined on a solid shaft. An eccentrically bored sleeve is fitted over the shaft. Both eccentricities are the same.

When the sleeve is positioned on the shaft so their eccentricities are additive, the total eccentricity or trough stroke is maximum. In turn, it passes on maximum capacity to the feeder or conveyor.

To reduce capacity, the sleeve is rotated on the shaft; the effect being to decrease the total eccentricity. By rotating the shaft 180°, the two eccentricities cancel each other. This results in zero trough stroke and zero capacity.

Because of this variable stroke feature, the new vibrating conveyors can vary retention time in drying, cooling or dewatering. Also, changes in conveying speed can be helpful in packaging and feeding.

A Gentle Push—Material is moved with a gentle tossing and catching motion rather than a sliding or batting action. Fragile products are conveyed without damage.

The gentle action almost stops dust problems in the movement of fine grain materials. Most materials can be moved up inclines to 10°.

The entire conveying trough goes through the same vibration cycle. Thus, there are no dead spaces. This also causes the trough to be self-cleaning.

Stresses are uniformly distributed over the entire conveyor, and spring stress and flexure are kept unusually low. Lubrication is confined to drive, motor and self-aligning ball bearing units, minimizing maintenance.

Powerful Multi-Die Drawbench Straightens Long Steel Bars

With a pulling force of 75,000 lb, a high-speed drawbench processes up to 40,000 lb of steel bars per hour.

It maintains straightness to within 0.002 in. on bars measuring up to 57 ft long.

■ A new high-speed drawbench at the Nelsen Steel & Wire Co., Franklin Park, Ill., processes bars from ¾-4 in. in diameter. It maintains straightness to within 0.002 in. on lengths up to 57 ft.

Before the bars enter the drawbench they're tripped, one at a time, onto a roller conveyor. This conveyor carries them through a shot-blasting machine where they're blasted with steel shot at the rate of 100-125 fpm. This produces a clean, scale-free finish.

Triple Toss—Three individually-driven, high-speed rotating wheels are used for centrifugal blasting along the full length of every bar. Each wheel throws about 750 lb of shot per minute or 135,000 lb per hour.

The spent shot is recirculated. After it's air cleaned, it returns to the 5-ton capacity machine for reuse.

As clean bars leave the blasting machine, an adjustable table feeds the hot-rolled steel to the drawbench. This bench is capable of drawing three 1¼-in. bars simultaneously at speeds up to 350 fpm. The new equipment can handle 40,000 lb of steel per hour.

The versatile bench is equipped with hydraulically - mounted die heads. These heads allow the machine with his plant superintendent. Interchangeable die heads govern the diameter of the bars to be drawn.

BOSS IS HAPPY: Mr. D. B. Nelsen, Sr. (right), president of the Nelsen Steel & Wire Co., checks new ma-

chine to draw bars as straight as possible—with a minimum amount of camber. A statically-loaded, self-centering device keeps bars in line as they feed into the dies.

Quick Centering — Working on vertical and horizontal planes, a special hydraulic pressure system brings the dies to center as the bars are drawn. This operation produces bars with a straightness that's practically impossible to maintain with manually-adjustable dies.

Capable of pulling 75,000 lb from 25-350 fpm, the drawbench, with its accessory equipment, is 445 ft long. The entire installation occupies about a half acre of floor space. Bars on the production line travel about 1/10 of a mile from start to finish.

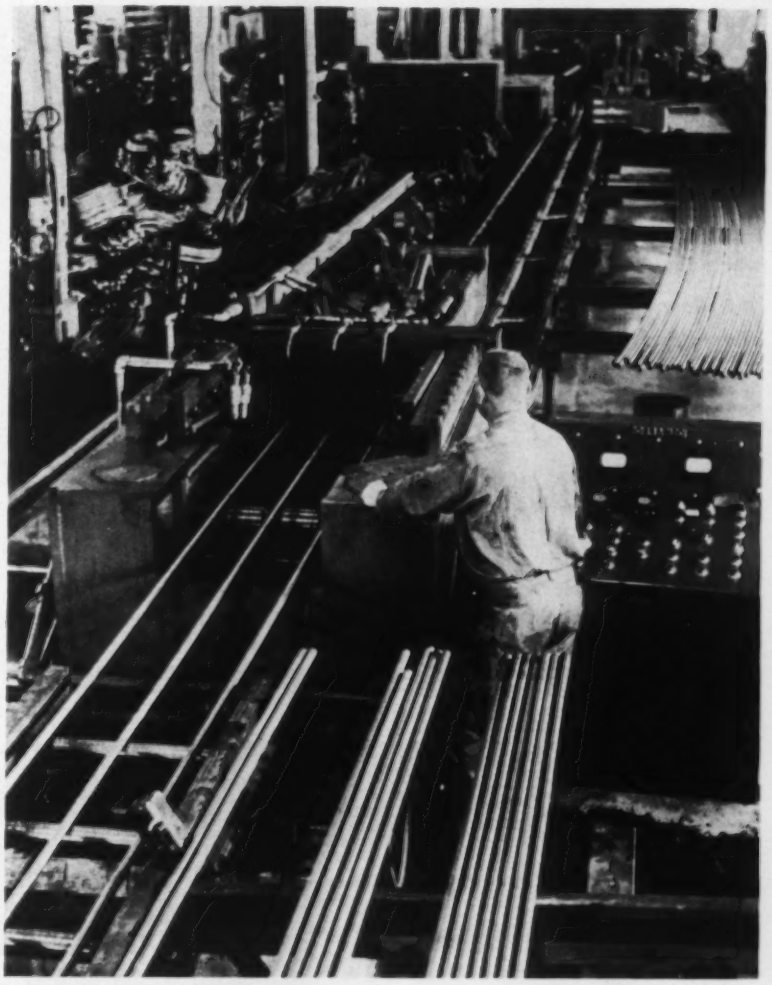
Power for the bench is supplied by a 350-hp motor. Maximum torque is 450-hp. This motor provides the necessary control of acceleration, deceleration and drawbar pull throughout the machine's entire speed range. Accurate control is maintained by electronic modules and a rotating exciter-generator unit.

Air Hook—The drawbench carriage uses an air-operated hook and jaws for sequenced automatic operation. A knee action on the hook insures draw starts and positive carriage runout at the end of each draw. Two spring-loaded shock absorbers keep the bars straight.

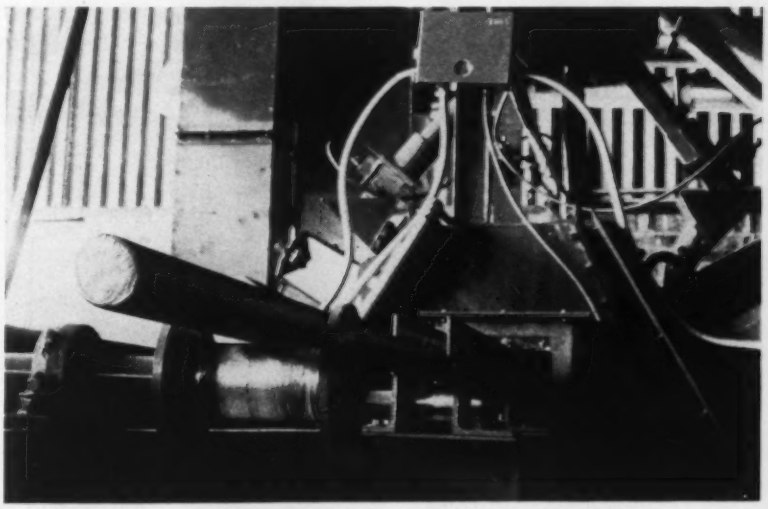
Automatic push-pointing of the bars results from an 180,000 lb push-pointer. It's mounted integrally with the bench's die stand. Twin hydraulic cylinders, mounted axially on the center line of the draw, supply the motive power.

Pneumatic unloading arms push each bar off the bench after it's drawn. These arms are fulcrumed from the side of the bench. When they're released, they swing under drawn bars as the carriage passes.

Mr. D. B. Nelsen, Sr., company president, states: "The new equipment, made by the Vaughn Machinery Co., is nearly twice as fast as the average cold-finishing equipment in use in most steel plants."



FAST RETURN: After each draw, the bench carriage returns to its start position to accept more bars. System can handle 40,000 lb per hour.



SCALE-FREE BAR: Blasting machine descales each bar before it enters the draw-straightening machine at the rate of 100-125 fpm.

X-Ray Unit Records Stresses

Billion-Watt Tube Catches Metal in Motion

Moving parts can be X-rayed while they're hard at work.

A new flash-type X-ray tube allows metalworkers to analyze high-speed mechanical stresses —even in very thick sections.

▪ Basic research has led to the development of an X-ray unit that can photograph high-speed mechanisms in opaque media. The unit operates fast enough to catch the action of a bullet as it passes through a gun barrel.

Such a tool will be valuable to the metalworking industry for analyzing high-speed mechanical stresses.

Radiographs are produced by means of electronic flashes emanating from a billion-watt X-ray tube. The high speed flashes are made possible by a square-wave pulser. The pulser controls its discharge by using pressurized dry nitrogen to surround its spark gaps.

Checks Thick Sections — The X-ray tube's electron source, developed by the Field Emission Corp., McMinnville, Ore., emits a beam of unusually high current density. This allows photos to be taken through 4-in. thick steel or up to 8-in. thick aluminum in 1/5 millisecond.

The pulser obtains a peak power of 1,200,000,000 w from a relatively low power source. The power is collected slowly, much like a bucket that is filled with water from a dripping faucet—then emptied all at once.

Vacuum Needs — The billion-watt, flash X-ray tube requires a very high vacuum. It must be a million times higher than that of a standard radio tube. The company obtains such a vacuum by a special process using gaseous hydrogen, oxygen, and liquid nitrogen, supplied by Air Reduction Pacific Co., San Francisco.

In the process, the few molecules remaining after vacuum pumping are "frozen-out" by inducing them into a more manageable liquid state. This is done at very low temperatures.

Fills the Need—The X-ray unit's high degree of reliability and reproducibility gives it many testing jobs in developmental laboratories, and in industry. Other models are used for radiation studies.

The units provide high intensity radiation (dose rate of 10^8 Roentgen/seconds) from a reasonably small source. This proves useful for environmental testing of equipment used with nuclear-powered devices and satellite hardware.

Further investigation of the field emmission principle has led the company to develop a new portable X-ray machine. The self-powered unit weighs only 45 lb. This suitcase-sized machine can be taken to remote areas in the plant or it can be used for field tests.

FINAL SEAL: This billion-watt, flash-type tube requires a very high vacuum before it's sealed. Many gases help to create the vacuum.

PRECISION IN STEELMAKING by Acme-Newport

Furthers UNIFORMITY in Your Product

Customers profit by the precision control that has dominated every operation of this basic steel producer for 77 years. Modern facilities and methods, and men proud of their workmanship, provide constant product improvement at Acme-Newport. A typical result is electrical sheets of *known* core loss properties, uniform gage structure, increased permeability and high punching qualities. Sheets free of burrs and breaks in punching; fast, economical in assembly. Add unusual flexibility of scheduling, and manufacturers have ample reason to make Acme-Newport a regular source of supply. Let our metallurgists tell you more.

Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

Steel

PRODUCTS OF ACME-NEWPORT STEEL

- Hot Rolled Steel in Coil
- Hot Rolled Pickled Steel in Coil
- Hot Rolled Sheets
- Hot Rolled Pickled Sheets
- Cold Rolled Steel in Coil (*full hard only*)
- Cold Rolled Sheets
- Alloy Sheets and Plates
- Plates (5/16" *and lighter*)
- Electrical Sheets
- Electric Weld Line Pipe
- Spiral Welded Pipe

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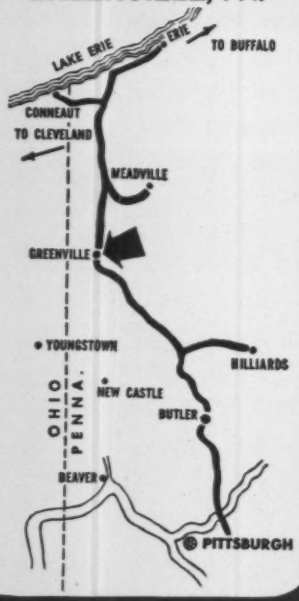

Here is an attractive, level, flood-free site of 750 acres that will provide the space you need for present and future production needs. It is ideally located only 80 miles from Pittsburgh and Cleveland; 150 miles from Buffalo.

This Bessemer site scores high when you consider these advantages: 24-hour delivery of steel and other basic materials; extensive deposits of coal, limestone, clay and aggregates nearby; an ample labor force of widely diversified skills; abundant supplies of power, gas and water.

Investigate today! Complete, confidential site planning and industrial engineering services are available, without obligation.

BESSEMER and LAKE ERIE RAILROAD CO.
INDUSTRIAL DEVELOPMENT DEPARTMENT
1830 FRICK BUILDING • PITTSBURGH 30, PA. • ATLANTIC 1-4780
The Bessemer Man is at your "Site Service"

NEW PATENTS

Makes Nodular Iron

Nodular iron manufacture, W. G. Longstreth and R. A. Van Patten (assigned to Ford Motor Co.), Sept. 26, 1961. In the manufacture of nodular cast iron, a layer of metallic magnesium is placed in a preheated ladle and covered with a layer of ferrous metal material such as steel punchings. The ladle is then filled with molten cast iron. U. S. 3,001,869.

Free-Machining Alloy

Free-machining austenitic alloys, K. Metcalfe (assigned to Universal-Cyclops Steel Corp.), Sept. 5, 1961. A free machining, austenitic, chromium-nickel steel consists of 15-30 pct Cr, 6-40 pct Ni, up to 0.25 pct C, 0.05-0.2 pct S, 0.25-1.35 pct Al, and the remainder Fe and incidental impurities. Canadian 626,966.

Iron Pellet Furnace

Pellet furnace, P. L. Steffensen (assigned to Bethlehem Steel Co.), Oct. 10, 1961. This patent covers a design for a vertical installation for indurating and cooling iron-ore pellets. The advanced design promotes good fuel economy, cuts down dusting in the combustion chamber, and maintains proper pellet temperatures at top and bottom. U. S. 3,003,756.

Sintering Method

Method of sintering, H. M. Kraner and R. A. Limons (assigned to Bethlehem Steel Co.), Oct. 10, 1961. In the sintering of Mesabi hematite or similar sticky iron ores, the ore is first admixed with a sufficient quantity of previously-sintered dry material to reduce the water content to 3-7.5 pct. Then the mixture is screened at 3/16 in., and the throughs remoistened to sintering consistency. U. S. 3,003,864.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Wear Castings

Steel wear parts may look the same and fit the same, but it takes an analysis to tell the difference. Metallurgical differences in heat treating, alloys can increase production. To help buyers make intelligent decisions when it comes to the purchase of wear parts, an informative 16-page booklet lives up to its title—"Facts About Manganese Steel Castings." (American Brake Shoe Co.)

For free copy circle No. 1 on postcard

Compares Epoxy Resins

In easy-to-read chart form, a new four-page folder compares 17 different epoxy resins. It lists components, primary uses, handling characteristics and physical and electrical properties. (Mitchell-Rand Mfg. Corp.)

For free copy circle No. 2 on postcard

Environmental Control

In a new 128-page catalog, a complete line of equipment for controlling test environments gets comprehensive treatment. The fully-illustrated volume contains complete specifications, descriptions and prices. (The Electric Hotpack Co., Inc.)

For free copy circle No. 3 on postcard

Hydraulic Fittings

In four pages, a new brochure describes a series of hydraulic fittings designed to eliminate conventional manifolds. The fittings assemble manifolds in the building-block fashion. The free literature includes easy-to-read diagrams of the standard fitting arrangements, and contains detailed instructions on how to order. (Flodar Corp.)

For free copy circle No. 4 on postcard

Paper-Mill Metals

Special metals for a variety of components in the paper mill industry are the subject of a new folder. Included is a handy materials selection chart. (H. K. Porter Co., Inc.)

For free copy circle No. 5 on postcard

Thin-Section Bearings

A manufacturer of precision balls and bearings, describes thin-cross-section bearings used in equipment operating at low or oscillating speeds under light to moderate loading. The bulletin illustrates a typical bearing mounted in rotating electronic equipment and describes OD/ID dimensions, material, and production tolerances. (Industrial Tectonics, Inc.)

For free copy circle No. 6 on postcard

Tape-Controlled Drills

Four basic models of six- and eight-spindle, tape-controlled drilling machines are illustrated and described in a new 16-page catalog. Many new features and optional attachments to expand the versatility of the basic units are also covered. (Burgmaster Corp.)

For free copy circle No. 7 on postcard

Dust Collector

An economical and highly efficient unit type dust collector, designed to meet a wide variety of air volume needs, is described in four-page bulletin. This folder explains the versatile cloth filter bag dust control equipment—how it is made, how it works, its range of use and application, its special features and details. (Pangborn Corp.)

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Storage Planning

A new 48-page catalog serves as a guide for selecting space saving

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 11/16/61

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FREE LITERATURE

storage equipment. It contains descriptions, illustrations and specifications for a complete line of equipment for storing everything from the smallest parts to palletized loads. It also provides information on storage planning. (The Frick-Gallagher Mfg. Co.)

For free copy circle No. 9 on postcard

Films Guide the Way

More than 300 movies available on free loan to clubs and other adult groups are described in a new 34-page catalog. The movies are made available on loan by numerous industrial companies, professional societies and other organizations as part of their public information programs. (Modern Talking Picture Service, Inc.)

For free copy circle No. 10 on postcard

Plastics Education

The Society of Plastics Engineers offers a new, 12-page, brochure entitled "Engineering Education in Plastics." The brochure includes a comprehensive discussion of the need for specialized training to prepare an engineering student for a career in plastics as well as a description of recommended courses for such training. (Society of Plastics Engineers, Inc.)

For free copy circle No. 11 on postcard

Rinse-Tank Additive

To eliminate drying stains and minimize "spotting out," a new liquid additive aids in removing water from water rinse tanks. When used on otherwise untreated steel, it provides a film which has mild rust-inhibiting properties. Further details are available in a new technical bulletin. (Frederick Gumm Chemical Co., Inc.)

For free copy circle No. 12 on postcard

Architectural Panels

An eight-page brochure describes a line of porcelain-enameled architectural panels. Full-color photographs show typical uses for the panels in various types of buildings. (Caloric Corp., Architectural Porcelain Div.)

For free copy circle No. 13 on postcard

Strips Silver Safely

All the details on a new acid solution, for stripping silver from copper, brass and other copper alloys by immersion only, are set forth in a two-page technical data sheet. In addition to its primary function of removing silver from rejected parts, the stripper can also be used to bright dip silver-brazed assemblies. (MacDermid Inc.)

For free copy circle No. 14 on postcard

Glance at Fuji Steel

Pertinent information regarding the Fuji Iron & Steel Co., Ltd., its manufacturing facilities, products, sales, raw materials imports and financial structure, is presented in an attractive full-color brochure. Particular emphasis is laid on the scope of the company's expansion projects.

For free copy circle No. 15 on postcard

Bearings Galore

Aptly entitled "Bearings," a new 12-page technical bulletin covers all sizes and styles of "Life-Lube" permanently-lubricated, ball-bearing pillow blocks, flange units and take-up units, as well as porous-bronze and babbitted pillow blocks. (T. B. Wood's Sons Co.)

For free copy circle No. 16 on postcard

Net Prices for Rivets

An important change in pricing practice in the rivet industry is represented by a new net-price catalog. The new listing replaces the company's standard list-price catalog and discount sheet which required several steps and calculations by the buyer in order to compute the price of a rivet. (Tubular Rivet & Stud Co.)

For free copy circle No. 17 on postcard

Wedge-Shaped Screens

Uninterrupted slots running the full length of screen surfaces are one reason for outstanding performance from a line of wedge-shaped screens. At least that's the contention in a new brochure which discusses a complete line of screens for wet and dry screening jobs. (Hendrick Mfg. Co.)

For free copy circle No. 18 on postcard

Welding Controls

Data on the application of non-synchronous, resistance-welding controls are presented in a new 12-page offering. The booklet gives hints for the users of resistance-welding apparatus, and furnishes electrical and mechanical information on standard components which comprise a line of resistance-welding controls. (General Electric Co.)

For free copy circle No. 19 on postcard

"PASSING THE BATON"—FROM WHITING TO WHITING

The big Whiting Distributing Ladle has been storing the melt. Slag, rising to the top, has hardened to form a natural lid and retain the heat below. Now the "baton" — a stream of slag-free metal — is passed through the outside teapot spout into a Whiting Pouring Ladle with bottom tap for final relay to the molds.

This scene is typical of efficient foundry operations throughout the world. Whiting engineers, practical foundrymen themselves, have designed more than 200 types and models of metallurgical ladles to reduce costs, speed output and improve casting quality in every pouring operation. If you have a special need, they'll design a special ladle to meet it precisely. And there is no charge for this service. See your local Whiting rep or write direct.

FREE: Bulletin FY-163-R, *WHITING LADLES.* Forty pages of illustrated ladle models and accessories to cut your casting costs. Write for it today. *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois. In Canada: Whiting Corporation (Canada) Ltd., 350 Alexander Street, Welland, Ontario, Canada.*

90 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

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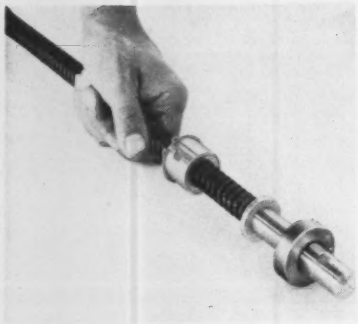
MANUFACTURERS OF CRANES; TRAMBEAM® HANDLING SYSTEMS; PRESSUREGRIP; TRACKMOBILES®; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT

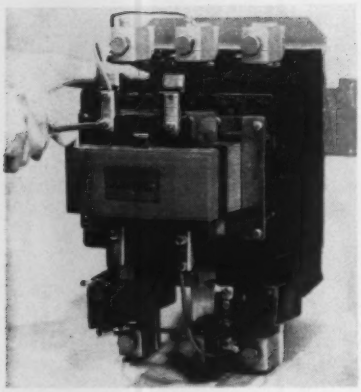
New Materials and Components



Anti-Friction Screw Lifts Loads in a Hurry

Here's an improved anti-friction screw that holds up without the need for heat treatment. The anti-friction screw has only four threads per inch. It will hold any elevated load such as a grinding head, chuck or jack, without slipping or counter-rotating. The unit offers a pitch accuracy of 0.001 in. for every inch of travel. Four-thread-per-inch design also permits rapid load positioning and lessens operator fatigue. The screw has a case-hardened, non-recirculating ball nut which prevents counter-rotating of the screw. Thus, the only force capable of moving the elevated load upward or downward is the relative rotation of the nut or screw itself. (R.C.S. Tool Co.)

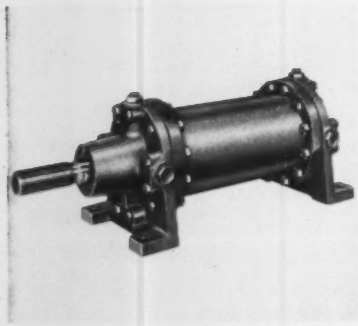
For more data circle No. 25 on postcard, p. 123



Small Contactor and Starter Speeds Motor Check

New NEMA size 5 contactors and starters up to 65 pct smaller in open forms than previous designs, have been added to a full line of motor controls. Dimensions of the new open starter are 14¼ in. high, 11¾ in. wide and 9 in. deep. The enclosed forms are 31⅛ in. high, 15¾ in. wide and 10½ in. deep. Inspection and maintenance is easy on the new size 5. Only the screws on the coil retainer need be loosened. The one-piece contact, coil and magnet assembly pull out to allow a quick visual check. No wiring is disturbed during contact inspection or coil change. Also, all connections on the new starter are made from the front, where solderless pressure-type terminals speed the hook-up process. Terminals on the starter take up to 500 mcm cable. (General Electric Co.)

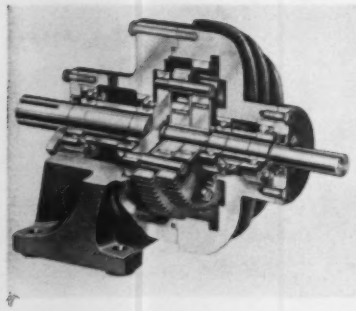
For more data circle No. 26 on postcard, p. 123



Mill-Type Cylinder Handles Heavy-Duty Jobs

Heavy-duty construction of a new mill-type cylinder makes it ideally suited for service where unusually severe operating conditions are the rule. Its steel flanges are held by spring-steel snap rings to seamless steel tubing. The tube's ID is honed to provide longer service life. End covers are attached to the flange with through bolts for easy assembly and maintenance. The cylinder is recommended for use in steel mills, aluminum extrusion mills, foundries and other heavy-duty operations. Its advanced construction features are said to cut overall costs. At the same time, they provide a big boost in operating performance. (Loganport Machine Co., Inc.)

For more data circle No. 27 on postcard, p. 123

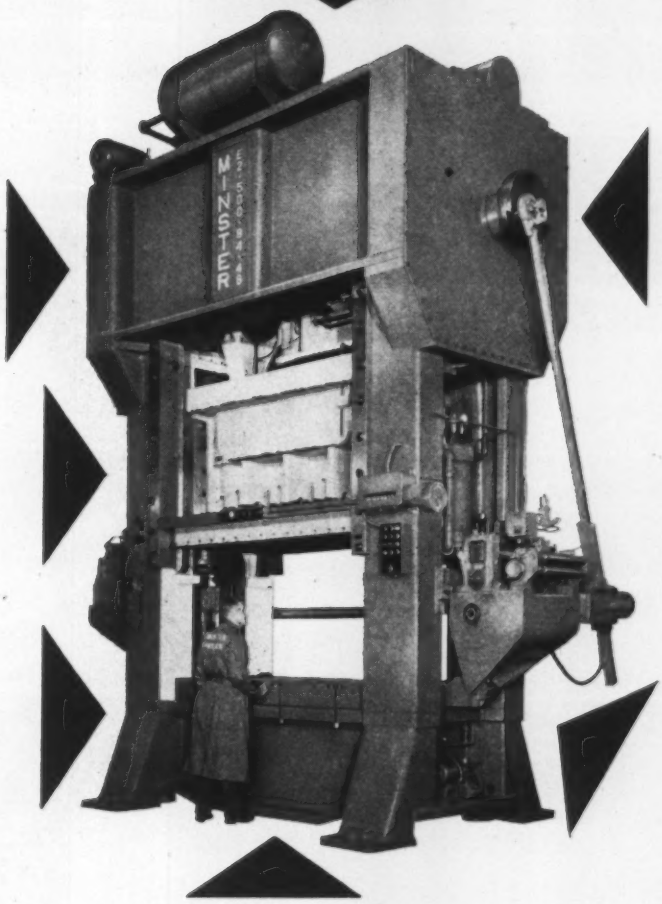


Designers Modify High-Range Reduction Drive

Design modification of a high-range reduction drive now gives standard ratios from 15:1 up through 174:1 in a single stage of reduction. The reduction drive is a compact unit, since input and out put shafts are on the same axis. Because higher ratios are obtained in a single stage of reduction, the drive units are very efficient, particularly in the higher ratios. Reduction drives are available in a wide range of torque ratings from 160 in.-lb through 6000 in.-lb of torque. A large stock is maintained for quick delivery of drives with many standard torques. (Black Tool, Inc.)

For more data circle No. 28 on postcard, p. 123

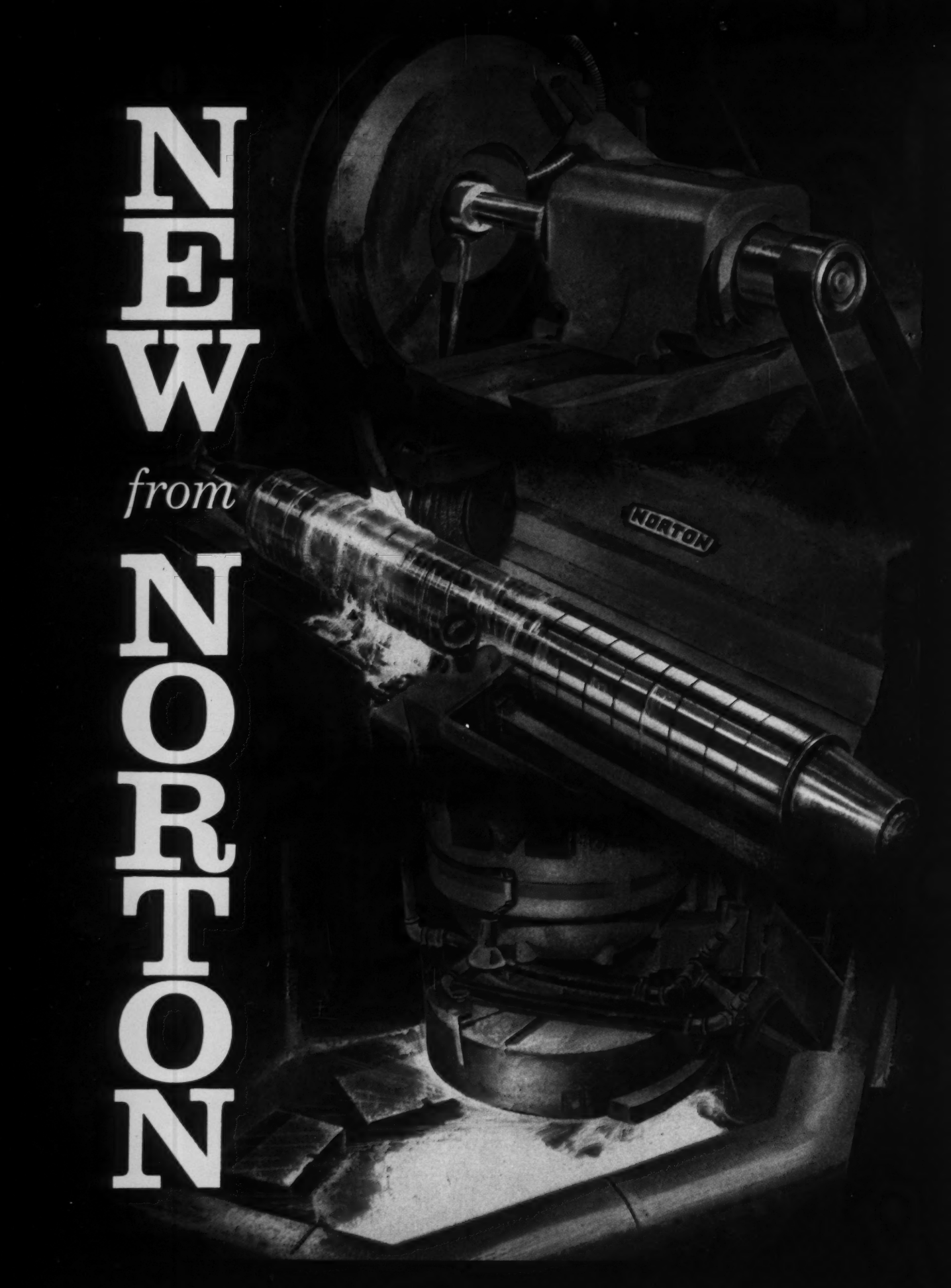
HIDDEN STRENGTHS and VALUES



There are many points of superiority in a Minster E-2 Heavy Duty Blanking and Progressive Die press . . . most of which are not immediately obvious at a glance. You might call them "hidden strengths and values." For example, the speed possibilities, the full eccentric shaft . . . the unique frame design.

If you buy with an eye to better all around performance, take a close look at the Minster E-2. 200 to 800 tons.
The Minster Machine Company, Minster, Ohio

MINSTER®


NEW
from
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Test
23 ALUNDUM* abrasive
for premium performance at non-premium price . . . on your production!

The newest Norton development for production grinding is for production economy, too.

It's 23 ALUNDUM abrasive.

This is no ordinary aluminum oxide. Except for price — which is *non*-premium — 23 ALUNDUM abrasive is *premium* in every respect. It has premium toughness . . . premium sharpness . . . and free, fast, cool cutting action that means premium precision performance.

Other big advantages are friability, which minimizes dressing . . . precise duplication, which assures uniform performance . . . and versatility that includes grinding of all steels, boiler plate, cast iron, Meehanite, aluminum and many other widely varying metals.

All of which adds up to the proved premium value of 23 ALUNDUM abrasive — in the broadest range of production grinding. For example:

Surface Grinding. With the new 23 ALUNDUM segments and cylinders, users are getting freer cutting and higher production rate on large die blocks, high vanadium steel tool bits, attrition plates, high carbon steel knives, stamped metal parts and similar work.

Centerless Grinding. Excellent results on bar stock grinding for automotive parts of carbon and stainless steels, cast iron and other metals, hard and soft.

Cylindrical Grinding. Top quality, low cost volume production of high speed steel drills, reamers and taps, laminated armatures, cams, shafts, sleeves and valve stems.

Internal Grinding. Bearing races and bores, precision ground faster to tight limits and fine finish, with less wheel dressing. Reduced grinding costs on cylinder bushings, die holes, rocker arms and wrist pins.

That's just a brief outline of 23 ALUNDUM abrasive's advantages for production grinding.

You can *see* them in action, right in your own plant — you can watch 23 ALUNDUM wheels or segments adding new speed, accuracy and economy to your own production grinding.

Your Norton Distributor or your Norton Man will be glad to arrange a test run in your plant, with expert aid in wheel selection. See him soon. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

NORTON
ABRASIVES

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Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — BEHR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

you may be overlooking one of your best opportunities to

REDUCE INDIRECT COSTS

In your search for new ways to reduce indirect costs, take a closer look at your fastening tools. These are most likely the busiest tools in your plant, in use hour after hour, day after day . . . and every use offers an opportunity to reduce indirect costs.

Apex fastening tools will help you cut costs every time you drive a screw or run down a nut or bolt. Each Apex tool is designed for use with a specific type and size of fastener. The tool fits the fastener properly, insuring smooth, firm assembly without harming the product or wearing down the tool.

Each Apex tool is carefully heat-treated in Apex' own metallurgical department, insuring the correct degree of toughness and resiliency for your specific application. And every Apex fastening tool is built for continuous, production line use, insuring longer service life with far less downtime for replacement.

IMPACT/POWER SOCKETS, EXTENSIONS, ADAPTERS, NUT SETTERS, UNIVERSAL WRENCHES, EXTENSION UNIVERSAL WRENCHES

There are over 7,000 types and sizes of Apex Nut Running and Screwdriving Tools, for use with all popular makes of air and electric power tools.

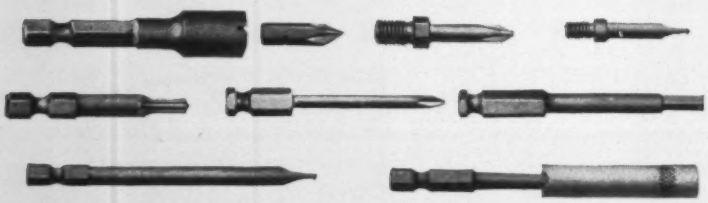
NUT RUNNING TOOLS
Catalog 30-A—¼", 5/32", 3/8", ½", 5/8" square drives, ¼", 5/16", 7/16", 5/8" hex drives.

Catalog 30-B—¾", 1", 1¼", 1½", 2½", 3½" square drives, 7/16", 5/8", ¾" hex drives.

Catalog 30-D—Specials and Spline Drive.

SCREWDRIVING TOOLS
Catalog 30-C—Standard and Magnetic.

BIT HOLDERS, INSERT BITS, POWER BITS, FINDER SLEEVE ASSEMBLIES, HAND DRIVERS



APEX FASTENING TOOLS
SCREWDRIVING • NUT RUNNING • SPECIAL

DESIGN DIGEST

Helpful Tube Joint

A proven joining principle has now been adapted for a new type of tube joint. Called Flexmaster, the joint is available in tube sizes from

1 in. through 4½ in. The joint was designed to meet ASA requirements for 150 lb service with a large margin of safety. It will withstand temperatures from —30°F. to +250° F. Tubes can be joined quickly without flanging, threading, welding, grooving or other tube-end preparation. Up to 4° angular misalignment and axial tube adjustment is permitted without leakage. Vibration and shock are absorbed by the soft, thick rubber of the gasket. All other components are made of corrosion resistant cad plated steel with post chromate bronze finish. (Marman Div., Aeroquip Corp.)

For more data circle No. 29 on postcard, p. 123

Temperature Control

This high vacuum thermocouple controller, designated the TC-9, is a dual control unit for the automatic

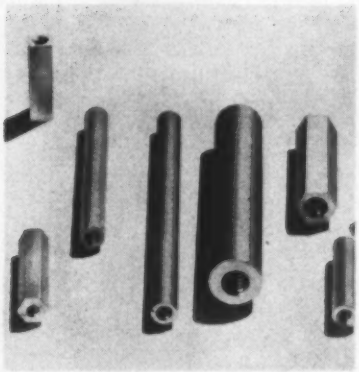
control of vacuum systems. The unit is an automatic solid state device with continuous "no kick" indication even in the control region. It is designed for system protection,

automatic process control, pressure monitoring, and for remote operation in inaccessible areas. Response time is less than ½ second. The unit is adjustable over a vacuum of 1 atmosphere to 1 micron, and has 2 control actions per control point. These control points are independent and may be used to control a total of 4 loads. (Vacuum-Electronics Corp.)

For more data circle No. 30 on postcard, p. 123

Standoffs, Spaces, Posts

These spacers are used for separation or support of components or structural members in electronic assemblies, gear trains, mechanisms, and multisection switches. The tubular spacers have precision machined ends and accurately controlled lengths and are available in round, square or hexagonal outside diameters. A choice of aluminum,



brass, corrosion-resistant steel or cold rolled steel is available. The right stock spacer for any given application is simplified by a wide selection of stock sizes and protective finishes. Posts are designed to support and separate components or structural members without the need for long screws or machine nuts. They are used widely in electronic, electro-mechanical and mechanical assemblies. Thousands of stock variations are available in prototypes and production quantities. (Angler Industries, Inc.)

For more data circle No. 31 on postcard, p. 123

Impulse Counter

Featuring a manual push-to-start button, the impulse counter is built with an automatic reset for fast, ac-

SAFE, RELIABLE POSITIVE CONTROL

Convenience, positive control and protection for the operator are provided by the pistol-grip, push-button control station of the Coffing Quik-Lift electric hoist.

Loads can be raised or lowered while pulling a trolley mounted hoist since a strain cable is incorporated in the control cord. The control station is made of non-conducting, impact resistant plastic and the 115 volts at the station plus the interlocked push buttons make for safe operation. The V-type brake assures positive control of loads. Housing is of strong but light aluminum which makes for portability.

Ask your distributor about the twenty JF models with capacities ranging from ¼ to 2 tons or write for Bulletin ADH-65-CC.

COFFING HOISTS

DUFF-NORTON COMPANY

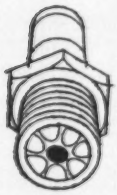
Four Gateway Center, Pittsburgh 22, Pennsylvania

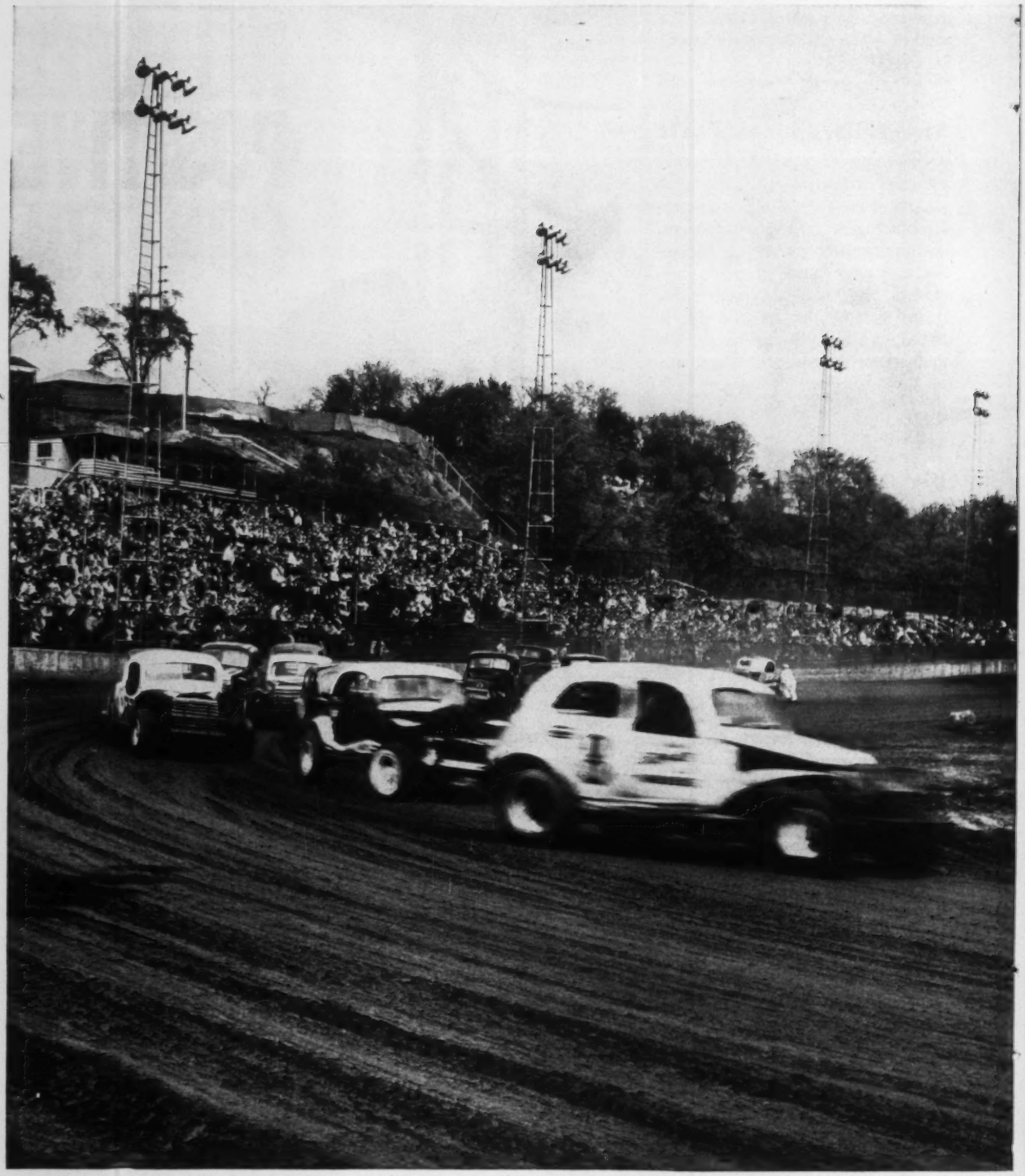
COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

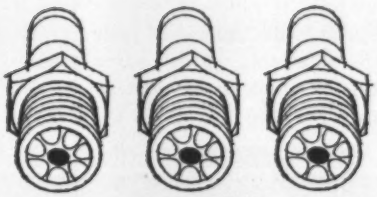
DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

The Porter Alloyist delivers the right alloy IN THE SPOTS THAT COUNT





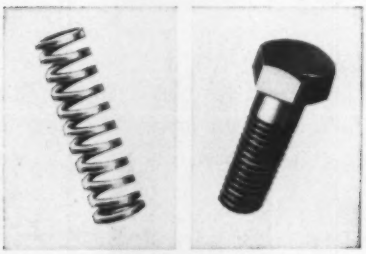


There can be no compromise in performance when there's a track record at stake. That's why the Porter Alloyist recommends special Inconel wire for stock car spark plug electrodes. It delivers high electrical conductivity with maximum resistance to erosion and corrosion by combustion gases.

THE PORTER ALLOYIST IS A SPECIALIST IN A WIDE RANGE OF SPECIAL METALS

Porter's Riverside-Alloy Metal Division is your single reliable source for specialty alloys in 8 basic groups of wire, rod and strip . . . phosphor bronze, nickel silver, cupro nickel, brass, stainless steel, nickel, Monel and Inconel.

Ask for a free copy of "Alloys for Industry" describing our wide range of specialty alloys. Write H. K. Porter Company, Inc., Riverside-Alloy Metal Division, Riverside, N. J. Or contact our sales offices in Hartford, Chicago, East Orange, Atlanta, Cleveland, Detroit, Cincinnati, Los Angeles and Rochester.



PORTER stainless steel, phosphor bronze, brass and other alloys serve in springs for many uses.

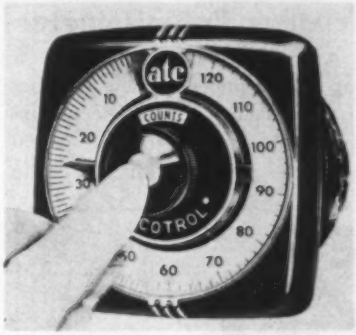
PORTER brass, nickel silver, Monel and phosphor bronze hold up under the stresses of cold heading operations.

PORTER

RIVERSIDE-ALLOY METAL DIVISION
H. K. PORTER COMPANY, INC.

DESIGN DIGEST

curate operation. Five ranges available, 1-40, 2-120, 4-240, 5-480 and 10-960 tallys at up to 500 counts per minute. Standard load ratings

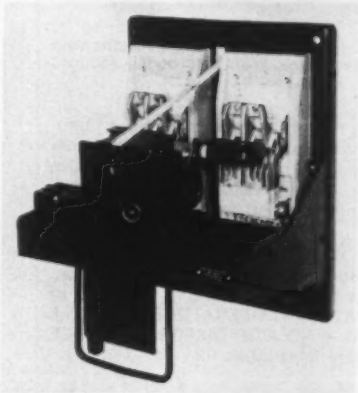


are 10 amp at 115 v ac; 5 amps at 230 v ac; and ¼ amp at 115 v dc (non-inductive). Ideal for batch process control and fluid metering, the counter incorporates an 8 point terminal block for individual wiring of all connections, and plug-in internal wiring for fast, easy service in the field. (Automatic Timing & Controls, Inc.)

For more data circle No. 32 on postcard, p. 123

Disconnecting Switch

A new low-voltage high-current disconnecting switch (Type DBDS) handles 1000-v, 10,000-amp dc or 600-v, 8000-amp ac. The easily op-

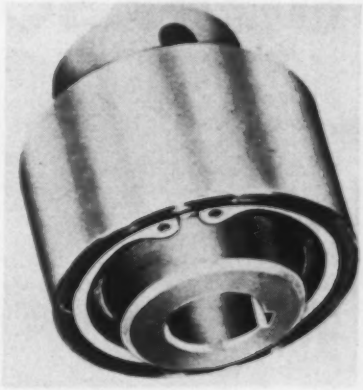


erated steel-panel-mounted switch uses components from the DB circuit breaker line to eliminate the arc chute and arcing contacts of the circuit breaker assembly. The switch is closed by a rotary handle motion and opened by a trip button. Switch position indication is provided in the operating mechanism, and auxiliary switches may be provided if desired. Bus connections are made from the rear of the panel. (Westinghouse Electric Co.)

For more data circle No. 33 on postcard, p. 123

Prevents Overloads

A frictionless overload protector coupling that is warranted for one million disengagement - engagement cycles is now being offered in five standard sizes. The smallest size is 1-in. diam, with bore-through of 0.312-in. and a torque range from ¼-24 in.-lb. The largest size is 2.875-inch diameter with bore-through of 1.125-inch and torque range from 1½ to 75 foot pounds. Custom sizes may also be ordered. An exclusive advantage of the new



overload protector is its ability to run in the disengaged position indefinitely without heating or binding. It has no frictional parts; hence it does not develop heat as friction-overload clutches often do. Also of note, the unit gives positive, no-creep drive, disengages when torque setting is exceeded, and re-engages (below 25 rpm) automatically at the same position on the shaft every time. There are no timing problems. Input goes in either end of the overload protector. It applies torque in either direction. (Helland Research & Engineering, Inc.)

For more data circle No. 34 on postcard, p. 123

Takes 1-Million Psi

An ultra-high strength tungsten carbide is being used to generate pressures of more than 1,000,000 psi. Anvils, dies, plungers, and

backup plates—ranging in diameters from 1-8 in.—are now being made from the new material. Phase changes that many materials undergo, when subjected to extremely high pressures, have interested scientists for many years. But the scope of their investigations has depended upon the strength of materials available for generating the necessary pressures. Availability of materials with higher strength and consistent quality should extend research into many new areas by employing higher and higher pressures. (Kennametal Inc.)

For more data circle No. 35 on postcard, p. 123

Trimmer Potentiometer

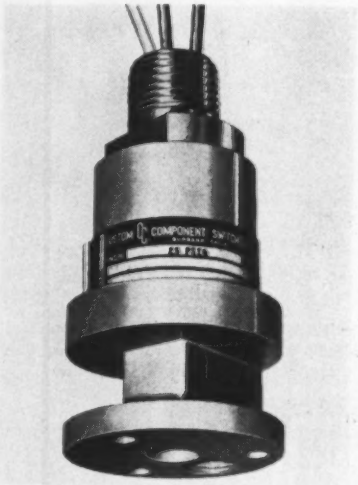
A machined aluminum case is one of a number of new wrinkles in the design of a new line of precision subminiature trimmer potentiometers. In addition to extra strength, the aluminum casing gives the adjustable, ½-in.-square potentiometer high power-dissipation ratings over an extremely wide tem-

perature range. The high-density, pill-size package also adapts itself easily to a variety of stacked and printed-circuit mounting configurations. These tiny potentiometers are used in the delicate matching, balancing, and adjusting of missile, computer, telemetering, control, and other types of critical electronic circuits. (Daystrom, Inc.)

For more data circle No. 36 on postcard, p. 123

Pressure Switch

Dual-snap design in explosion-proof pressure switches eliminates drifting of the actuation point due



to varying temperatures. This design feature also insures a positive setting. The new line of switches isn't affected by pump ripple or

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$17,360 per year
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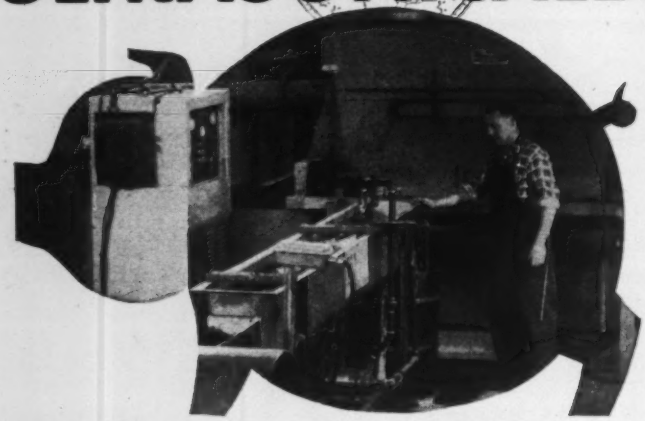

An experimental installation for removal of residual smudge from shot blasted strip by means of ultrasonics. A joint project of Pangborn Corp., Wean Engineering Co., Inc., and Branson Instruments, Inc.

The shotblast method of descaling strip is becoming more and more popular, especially among the lower tonnage producers, converters and fabricators. In this process, hot bands are descaled in a blast cabinet with abrasive shot.-Today ultrasonic cleaning is on the way to replacing flash pickling. This method, which eliminates stream pollution and acid disposal, offers many extras:

• LOW INITIAL INVESTMENT (for tanks due to inexpensive steel construction) • LOW MAINTENANCE COSTS • LOW OPERATING COSTS (in terms of heat and power input) • REDUCED OPERATING TEMPERATURES • LITTLE OR NO CORROSION • NO FUME REMOVAL • NO ACID DISPOSAL • SPACE SAVING (ultrasonic installations are shorter in length).

Branson's highly experienced, factory trained specialists stand ready to assist you anywhere in the U. S. Tell us about your particular problem and Branson's enginering department shall try to find the best possible solution in the shortest possible time.

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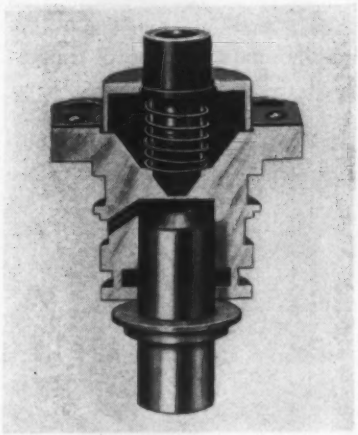
pulsation. Every switch is vibration-proof and withstands high impulse cycling. (Custom Component Switches Inc.)

For more data circle No. 37 on postcard, p. 123

Spots Pressure Drop

Available in extremely small sizes, a complete line of pressure indicators operate on a magnetic principle that eliminates the need for mechanical linkages. In operation, a red button on top of the indicator pops up at a preset pressure. Thus, there's a positive visual indication of excessive pressure drop. The actuating pressure can be adjustable or factory set. For mounting purposes, piping, tubing, bolts or a mounting cavity will do the trick. The units are available for system working pressures up to 10,000 psi, and for temperatures from —65°F to 275°F. Actuation can be set from 1.5-100 psi drop. Also, extended ranges are available on special order. (Pall Corp.)



For more data circle No. 38 on postcard, p. 123

Explosive Nuts

The development of a new line of explosively actuated nuts for use with standard AN bolts has recently been announced. The new design provides instantaneous (0.002 seconds) release of the nut from a standard AN bolt. Models are available to accommodate standard bolt thread sizes from ¼-1½ in. All of the explosively actuated nuts are designed to meet the strength requirements of the bolts with which they are used. Typical applications include missile separation systems, or emergency hatch and airborne external stores release systems. (Conax Corp.)

For more data circle No. 39 on postcard, p. 123

Ceiling Suspension

New on the market, a unique suspension system lets you install acoustical ceilings swiftly, securely and economically. Called Rigid Grid, the system consists of 4 simple basic components. Key item is a new, positive locking device at all intersections of the framework. The parts—main tee, cross tee, perimeter moulding, and beam splicer—lock rigidly, stay square and are easily disengaged for maintenance of pipes and fixtures concealed above the accoustical ceiling. In actual installation, a large area can be covered from a single scaffold position. This reduces the number of scaffold moves required for a given area. Due to the positive locking device, no special tools are

Ruggedly Built

—AND THOROUGHLY PROVED BY YEARS OF HARD EVERYDAY USE IN THOUSANDS OF PLANTS

HANSEN

ONE-WAY SHUT-OFF

QUICK-CONNECTIVE

PUSH-TITE COUPLING

Here's the fluid line coupling that can really take it. The ability of Hansen Push-Tite Couplings to withstand severe service—with practically no maintenance—has been thoroughly proved by years of hard, everyday use in thousands of plants.

To connect a Hansen Push-Tite Coupling, you merely push the Plug into the Socket as easily as plugging in your electric shaver. Flow is automatic—instantaneous. Plug swivels freely—no kinking of hose. To disconnect, pull back sleeve on Socket. Instantly and automatically, Socket shuts off flow of air or liquid.

QUICK

CONNECTION AND DISCONNECTION

INSTANT

AUTOMATIC FLOW OR SHUT-OFF

Leak-Proof, Minimum Wear Locking Device

Locking pins in Socket afford uniform large area contact with Plug—thereby preventing wear and subsequent leakage. The socket head, containing locking device, is factory assembled into a rugged integral unit which cannot be readily injured or have component parts lost by casual tampering.

Write for the HANSEN Catalog

Here is an always ready reference when you want information on fluid line couplings in a hurry. Lists complete range of sizes and types of Hansen One-Way Shut-Off, Two-Way Shut-Off, and Straight Through Couplings.

Representatives in Principal Cities ...See Yellow Pages

SINCE 1915 QUICK-CONNECTIVE FLUID LINE COUPLINGS

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 35, OHIO

EASY DOES IT . . . and it's easy to do with CF&I-Wickwire Swing Sling. Here, workmen at the Norton Company in Worcester, Massachusetts provide finger-tip control while transporting a 12-ton pulpstone to further finishing operations.

How Norton Company babies 12-ton pulpstones in a 30-foot Swing Sling* cradle

"Our customers are entitled to receive the product they buy in perfect condition," says Lester Knapp, foreman of the pulpstone assembly operation at Norton. When the product is a 12-ton pulpstone for the paper industry, carrying it with care is no easy matter. That's why Mr. Knapp is an enthusiastic booster of CF&I-Wickwire's Swing Sling.

"Because of the neoprene covering over the wire strands," reports Mr. Knapp, "there is no possibility of damaging the surface. Swing Slings have simplified and increased the efficiency of our materials handling system every step of the way."

Mr. Knapp is not alone in his praise for the Swing Sling. An ever-increasing number of men concerned with materials handling are finding that the Swing Sling is the long awaited answer to their problem. Swing Sling's exclusive neoprene blocks grip the load gently, lift it firmly . . . without damage to even the most easily-marred surfaces.

There's sure to be a Swing Sling to meet your specific requirements. For complete details, contact your CF&I-Wickwire sales office or distributor.

*Trademark—Patent Pending

8401

The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
Sales Offices in Key Cities

CF&I STEEL MADE IN U.S.A.

necessary. The installer simply snaps the locks into place. The entire suspension system is roll-formed from electro-galvanized steel, which has been finished in baked-on enamel. (Flangeklamp Corp.)

For more data circle No. 40 on postcard, p. 123

Bonds Plastic Laminates

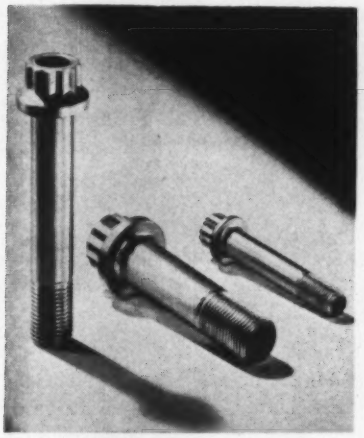
A new fast-drying, heat-resistant, high-strength contact adhesive bonds decorative plastic laminates to plywood and particle board. Designated as "Fastbond" 10, this synthetic rubber based adhesive permits bonding of the laminate within 10 minutes after adhesive application under normal conditions of temperature and humidity. The adhesive, however, will still provide an excellent high strength bond after one hour or more open time. (Minnesota Mining and Mfg. Co.

For more data circle No. 41 on postcard, p. 123

High-Fatigue Bolt

A new high-fatigue 180,000 psi tension bolt that meets a brand new military specification is being produced for aircraft, missile and related applications. The specification, MIL-B-8831, is the first to be issued by the military covering a 180,000 psi tension bolt. The new 12-point external wrenching bolt, is designated as military part number MS 21250. Principal change, and main reason for the increased fatigue performance, is the use of the MIL-S-8879 thread form, which has a controlled, large-radius thread root. Fatigue strength of the new bolt is

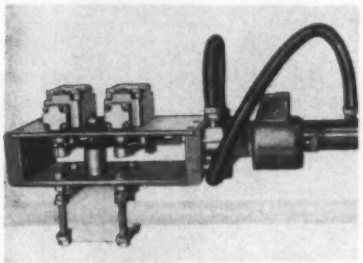
rated at 45,000 cycles minimum, 65,000 cycles average at an alternating load of 93,000 psi maximum



based on the minimum minor thread area. (Standard Pressed Steel Co.)
For more data circle No. 42 on postcard, p. 123

Controls Ball Valves

This remote control can operate all makes of ¼ turn ball valves. The operator, developed originally for the remote control of cryogenic valves handling exotic fuels, has many applications in every field where automation or remote control is desirable in the control of the flow of fluids. Operators are ruggedly constructed and are mounted on the valve by means of universal hangers. Neither the operator nor its accessories are attached to the



piping. Patented design eliminates side play action and valve stem strain. (Ju-No Supply Corp.)
For more data circle No. 43 on postcard, p. 123

Long-Stroke Diaphragm

Here's a complete line of long-stroke, elastomer diaphragms. These unique friction-free, rolling type diaphragms are designed and engineered to provide an effective pressure area which remains constant

We call the metal parts shown here Ultra-Special because they are the result of completely new cold-forming and finishing techniques. They are typical examples of how users are reducing costs by taking advantage of the strength, improved quality, close dimensions and economy of mass-producing parts by cold-forming.

In the past, the limitations of the cold-forming process forced manufacturers to accept parts which were made by other, more costly methods. Now, through extensive research and development work Townsend is cold-forming Ultra-Special items with intricate shapes and critical dimensions held to tolerances as close as .001 inch. They may be made by combining cold-heading processes with impact extrusions, special heat-treatment and coatings, to name but one of the new techniques.

The use of Townsend Ultra-Special items in your product assembly could provide the means to make better products at lower costs. Investigate by asking a Townsend field engineer to call. Write Townsend Company, Engineered Fasteners Division, P. O. Box 71-B, Ellwood City, Pa.

A textron COMPANY

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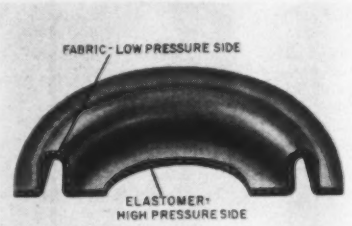
throughout its stroke. Also of interest, the diaphragms are virtually leakproof, have low permeability characteristics and can be used with

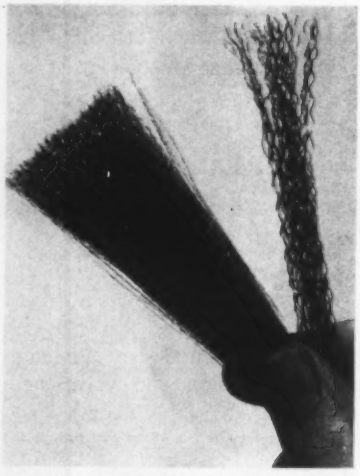


an almost infinite range of fluids and gases. Low pressure diaphragms (without fabric), plus high pressure diaphragms (with fabric) are offered. The high pressure type incorporate fabrics; such as, Dacron, Nylon, Teflon, glass, or similar materials depending upon the particular environmental and operating characteristics. (Diaphragm Industries, Inc.)

For more data circle No. 44 on postcard, p. 123

Multi-Strand Wire

One company has extended its multiple - strand brush wire size range down to 0.005-in. diam. Previously, the lowest diameter avail-



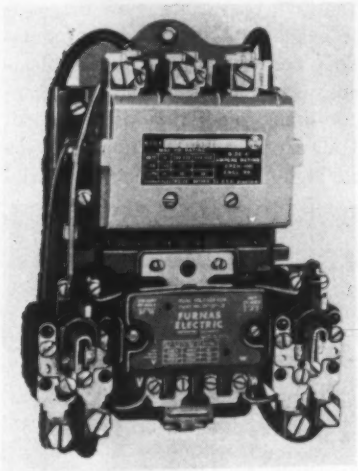
able was 0.008 in. The new line provides a range from 0.005 - through 0.018-in. diam. Multiple-strand brush wire can be supplied with exact wire counts ranging from 50 to 2000 wires per strand. Wire sizes 0.008 in. and lower are pin-

crimped. The coarser sizes are gear-crimped. (Worcester Wire Div., National-Standard Co.)

For more data circle No. 45 on postcard, p. 123

Magnetic Starter

Thirty-one pct smaller than a superseded model, this redesigned size 3 magnetic starter provides greater compactness and more wiring room. Available for 2, 3 or 4 pole applications, it incorporates the new inherently trip-free thermal overload relay with visual trip indicators. A

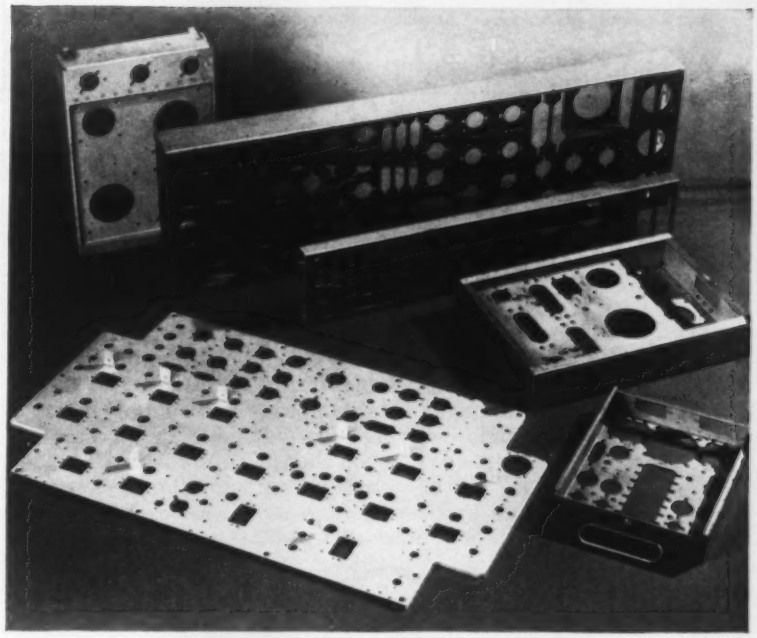


simplified electro-magnet design includes encapsulated magnet coil with built-in terminals. Dual voltage dual frequency coils are standard to match 110/220 and 220/440 v 50 or 60 cycle motor applications. (Furnas Electric Co.)

For more data circle No. 46 on postcard, p. 123

Nut Channel

This interchangeable nut channel eliminates the need for tapping of most holes in sheet-metal cabinets for mounting of panels and other accessories. The result is simplified installation of much electrical, electronic and instrumentation equipment. The new nut channel reproduces on one strip the sheet-metal hole spacings of both widely used industry standards — the Universal and the Retma. From one channel stock, manufacturers can now install nuts to meet either standard hole spacing. Standard length of the new channel is 70½ in. Hole pattern is such that segments as short



PUNCH COMPLICATED PATTERNS FAST

With the new improved STRIPPIT 15-A Fabricator, complicated patterns of round and shaped holes can be produced quickly and accurately in sheet material. A high speed punch press that enables you to produce finished pieces directly from drawings, the versatile STRIPPIT 15-A eliminates slow "in-between" tool designing and die making...saves you days or even weeks of valuable time.

The STRIPPIT 15-A features a unique multiple-stop gauging system for positioning work to exact layout specifications. Punches and dies...within easy reach in built-in file drawers...can be switched from one size to another in less than 20 seconds. Designed especially for prototype and short production runs, the STRIPPIT 15-A is easily converted to a high speed production punching unit with the STRIPPIT Duplicator.

The STRIPPIT 15-A:

- **PUNCHES** any round or shaped hole up to 3½" diameter. Maximum material thickness is ¼".
- **NOTCHES** 90° corners—rectangular, radii, vee and special shape edge notches—up to ⅛" capacity in mild steel.
- **NIBBLES** straight line or contour shearing up to 38" diameter circle, at 165 strokes a minute, ⅛" mild steel.

Send now for 15-A catalog. Free demonstration can be arranged right in your own plant.

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IMPERIAL D-C MOTORS

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Imperial D-c Motors meet the ever-increasing demand for dependable, heavy-duty drives in nearly every industry today. Over seventy years of d-c design and application experience is behind the manufacture of these motors. Ratings from 1 through 125 hp., for constant or adjustable speeds with shunt, series or compound windings are available in all standard enclosures. When you choose *The Imperial Line* you are assured of motors that stay on the job longer... keeping production high at lower costs. Write for bulletin or contact the sales office nearest you.

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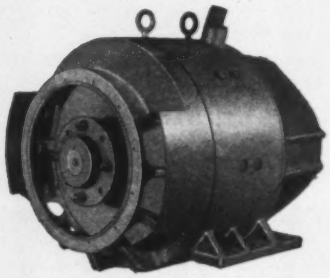
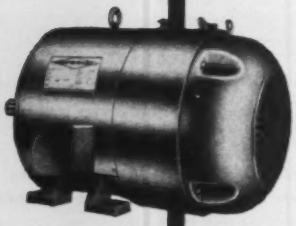
Semi-Guarded D-C Motor

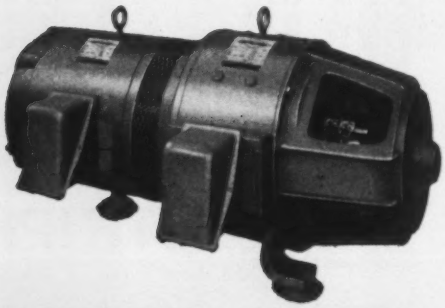
Drip-Proof D-C Generator, SAE Flange Mounting





Totally-Enclosed Fan-Cooled D-C Motor

Two-Bearing Motor-Generator Set

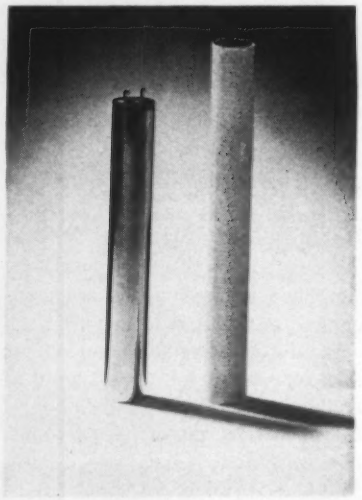


as 1¾ in., and larger multiples thereof, can be cut from the strip. (Standard Pressed Steel Co.)

For more data circle No. 47 on postcard, p. 123

Time-Delay Unit

A new time-delay switch is small, rugged and relatively insensitive to variations in temperature. It is gas damped for maximum reliability. These instruments were formerly available from the manufacturer on a custom basis only. Now they will be available as a standard product. They are used primarily in applications where a time delay or acceleration-time integration is required. They can be set to function at ranges as high as 50 G-seconds. Variation in time delay between —65°F and +250°F is only ±25 pct. Also, this instrument will meet the requirements of MIL-E-5272. (Inertia Switch, Inc.)

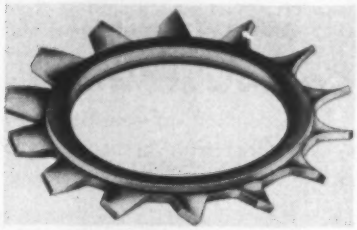


For more data circle No. 48 on postcard, p. 123

Lock Washers

Results of recent torque-tension tests on folded rim lock washers prove their high locking efficiency. These tests showed that in most cases the washer has a high off-on ratio. In other words, it takes more to get it off than to put it on. The folded rim lock washer is a modification of the standard external lock washer with a folded internal rim that provides additional

body strength to resist extreme fastening stresses when working with steel, die castings or other metals requiring high torques. It is par-



ticularly useful in applications involving high pressure sealing as the folded rim feature eliminates thread leakage. (Shakeproof Div., Illinois Tool Works, Inc.)

For more data circle No. 49 on postcard, p. 123

High-Strength Steel

Newly-developed steels combine high strength with unmatched ductility and toughness properties. These properties are achieved by a remarkably simple heat treatment involving a martensite transformation and age-hardening. The new family of nickel steels holds promise for applications involving exceptionally high pressures and stresses, especially in large structures where "on-site" fabrication is necessary. (The International Nickel Co., Inc.)

For more data circle No. 50 on postcard, p. 123

Controls Liquid Flow

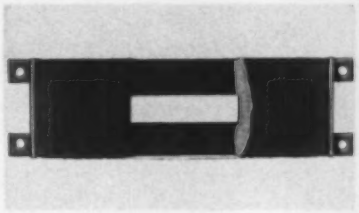
This alarm system is primarily designed for use on automatic filling machines and is a unique de-

vice for sensing slow down in pressure lines whether it be syrup, liquid, or water. Any failure in the supply immediately actuates an alarm bell which alerts the operator. Sanitary construction is featured throughout with contact surfaces of stainless steel. The internal diaphragm is of Neoprene. (Terriss - Consolidated Industries)

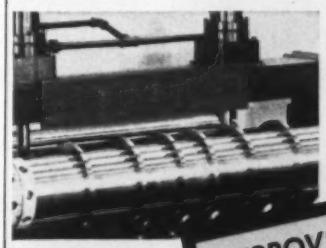
For more data circle No. 51 on postcard, p. 123

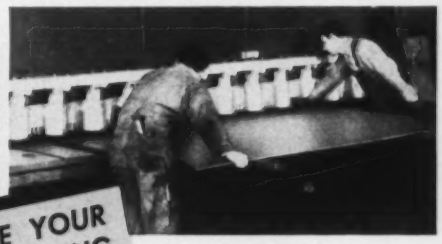
Protects Dock, Trucks

Unmatched truck and dock protection plus revolutionary mounting versatility are features built into these new dock bumpers. Protector bumpers cannot sag. The units are built around a heavy, 3-in. struc-



tural reinforcing bar. Cushioning action is achieved by fabricating protectors from tough rubber and



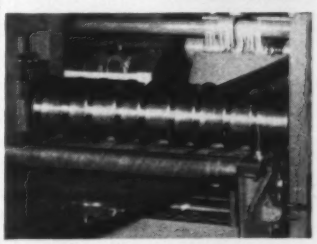


IMPROVE YOUR METAL CUTTING

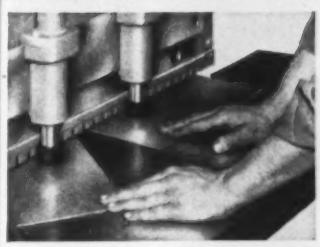
WAPAK

Metal Cutting Service

The proper knives, engineered for the job, can improve your metal cutting operation. A WAPAK survey of your operations will produce positive recommendations to improve both knife life and the quality of cutting.



Call on Wapakoneta for a complete study of ALL your metal cutting operations. Wapakoneta manufactures a complete line of circular, straight and irregular metal cutting knives. There's no obligation or cost.



All WAPAK knives are made of domestic tool steels by American machinery.

Write for free copy of Metal Cutting Manual

WAPAK KNIVES

THE WAPAKONETA MACHINE CO., WAPAKONETA 11, OHIO

Export Div.: 30 Church St., New York 7, New York

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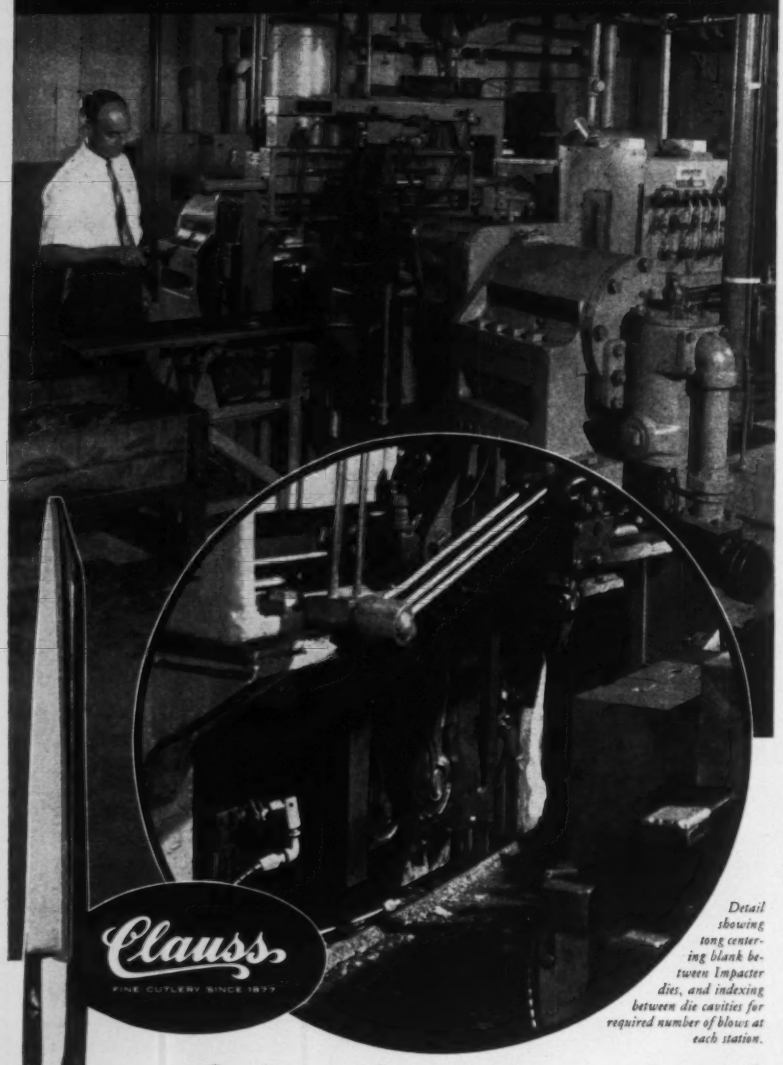
"The Model 'C' Impacter achieves new peaks of production speed and efficiency for Clauss"



Detail showing tong centering blank between Impacter dies, and indexing between die cavities for required number of blows at each station.

Clauss
FINE CUTLERY SINCE 1877

Scissor forgings produced automatically on the Impacter ..faster, better, more uniform

Clauss Cutlery Company, of Fremont, Ohio, famous manufacturer of scissors, shears and snips, is achieving remarkable results with the Cecomatic Forging Process, incorporating the Model "C" Impacter.

Better quality forgings are produced faster, with reduced scrap, and less stock required.

Dies last longer, scaling is reduced and parts dimensions vary less, greatly reducing mismatch of mating parts, according to R. W. Van Hook, Vice President, Clauss Cutlery Co.

Write for details and a copy of Bulletin 110-L-1, "Cecomatic Process for the Jobbing Type Production of Drop Forgings."

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

CHAMBERSBURG

THE FRANKLIN INSTITUTE'S 1961 LONGSTRETH MEDAL "FOR INVENTIONS OF HIGH ORDER" WAS AWARDED THE DESIGNERS OF THE IMPACTER

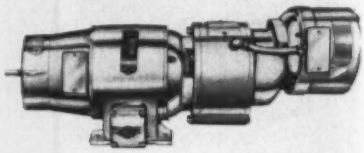
DESIGN DIGEST

fabric sections taken from the tread and laminated under tremendous pressure. (The Kelley Co.)

For more data circle No. 52 on postcard, p. 123

Crane-Hoist Motor

Safe handling of sensitive loads is facilitated with a special multi-drive crane-hoist power package.



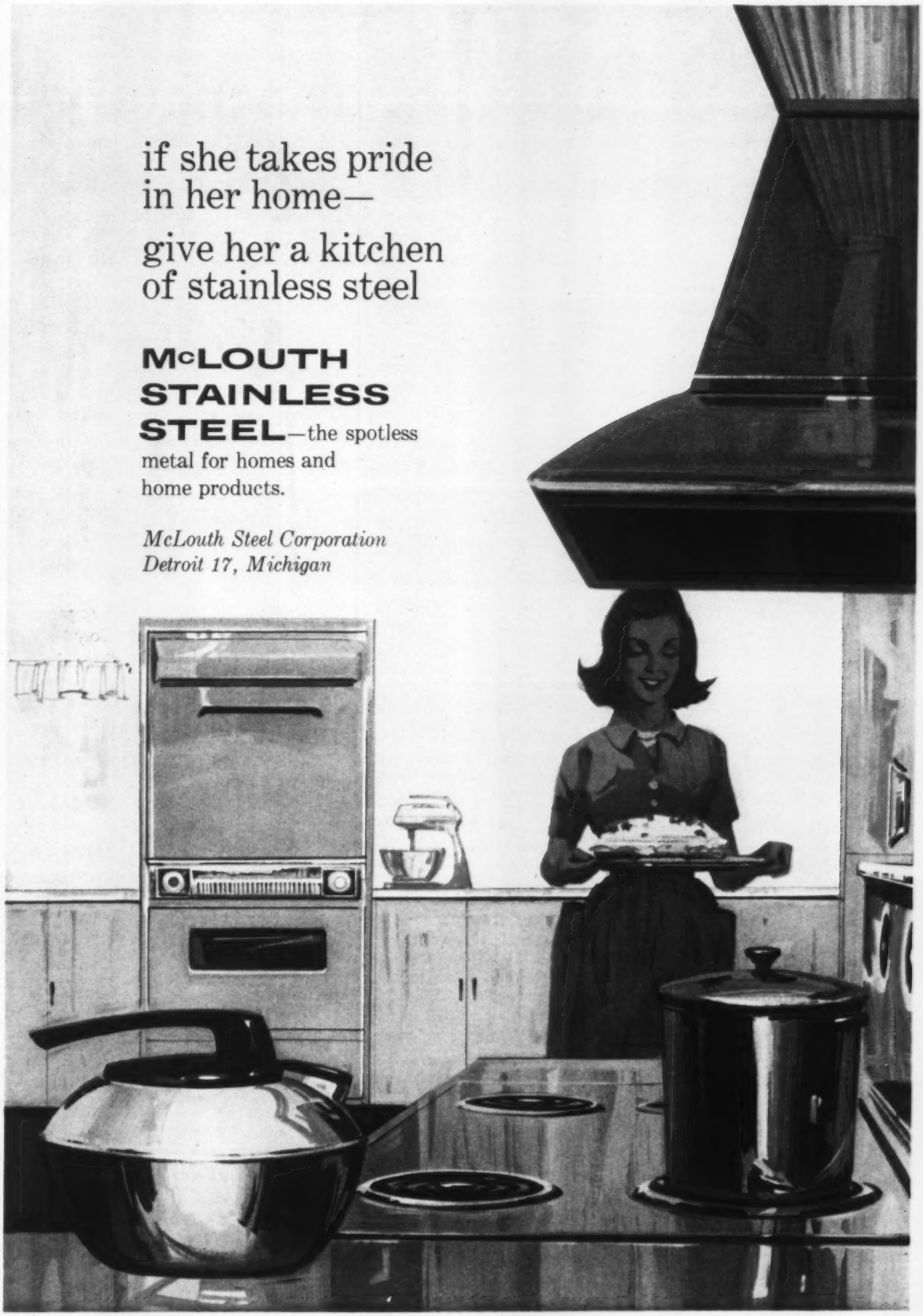
Two individual motors, connected by a clutch, maintain a slow speed for delicate lifting operations. These motors operate the crane at regular speeds for standard lifting and travel operations. (Reuland Electric Co.)

For more data circle No. 53 on postcard, p. 123

Speeds Drilling Jobs

Ball bearing precision delivers accuracy never before realized on drill speeder equipment. Simple and rugged construction of the units reduces maintenance to a minimum. The new drill speeders can be used in manual, semi or completely automated operations on all types of drilling machines. Recommended spindle speeds of from 1200 to 3200 rpm will produce maximum drilling speeds up to 20,000 rpm. (Tapmatic Corp.)

For more data circle No. 54 on postcard, p. 123


if she takes pride
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of stainless steel
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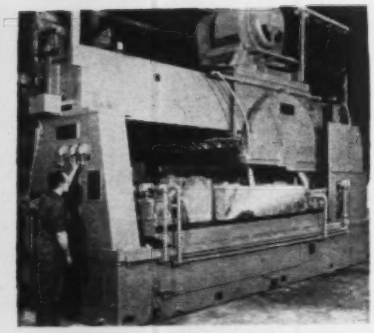
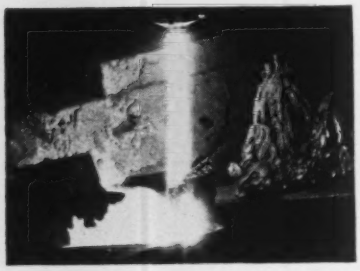
New Equipment and Machinery



Segmented Blade Solves Tough Sawing Problem

How are you fixed for blades? Saw blades that is, when your problem is cutting aluminum alloy billets and slabs, up to 26 in. in diameter, within close tolerances. Alcan's Quebec plant found the answer with a segmented circular saw blade that's 80 in. in diameter. A deep tongue and groove joint mates each overlapping segment to the saw body. This effectively prevents any loosening under heavy loads. To make doubly sure, four rivets are used to lock these segments to the saw body. If teeth should be damaged, one or more segments may be quickly and easily removed and replaced. Resharpening is also a simple matter. (Transmares Corp.)

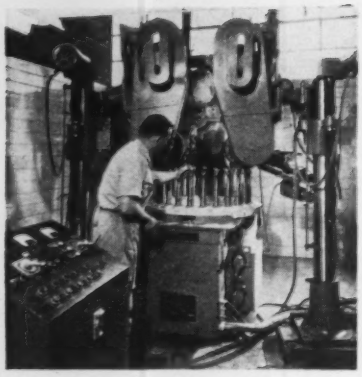
For more data circle No. 65 on postcard, p. 123



Newly-Designed Torch Intensifies Plasma Heat

Operating at 90 pct efficiency, a new plasma flame torch produces a quiet, non-oscillating flame with an ultra-high heat transfer rate. Continuous operation is possible with argon, nitrogen, helium, hydrogen, or any combination of these gases. Heat inputs range from 130-600 thousand Btu per lb of plasma gas. Temperatures in these ranges are well in excess of 60,000°F.; while the flame length can be varied from 1-20 in. In other words, there's a big boost in heating potential. (Thermal Dynamics Corp.)

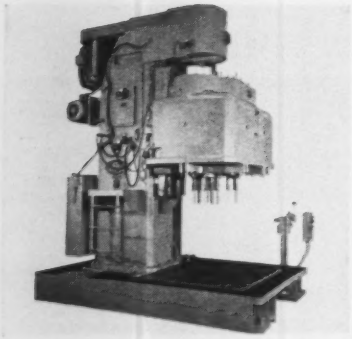
For more data circle No. 66 on postcard, p. 123



Springmaking Machine Combines Production Steps

Up till now, the fabrication of springs required two machines to perform two separate functions. One machine formed wire into coil. The other made loops on opposite ends of this coil. It was a two step job. Now, however, a new machine combines both these operations so that a completely formed spring is fabricated in just one cycle. Significant savings in production cost are the practical payoff. And there's no sacrifice of versatility. For example, the new machine can make different end loops, including extended hooks. It also has the ability to make many types of springs. Just as important, load tolerance tumbles to ±5 pct and better over-all quality control results. Production rate with a variable-speed drive is 720-6400 pieces per hour. (The Baird Machine Co.)

For more data circle No. 67 on postcard, p. 123



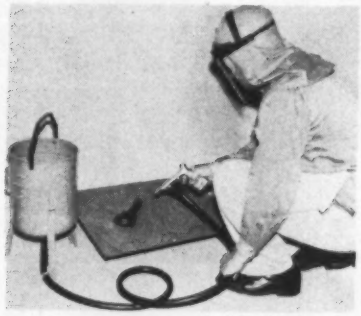
Drilling Machine Features Advanced Feed Control

Built in a variety of basic sizes ranging from 5-30 hp, new vertical drilling and tapping machines conform to both JIC standards and building-block concepts. One outstanding feature of the newcomers is their advanced hydraulic feed control system. Feed rates are infinitely variable over a range of 1-30 ipm. If desired, rapid traverse rates up to 275 ipm are available. For extremely fine adjustment, the hydraulic fluid is metered through special feed apertures. By the same token, the control panel comes complete with both pressure and temperature compensating elements. This insures that the feed rate stays uniform, once the correct fine adjustment has been made. (National Automatic Tool Co., Inc.)

For more data circle No. 68 on postcard, p. 123

Blasts Rust Away

A new portable sand blaster removes rust, paint and chemicals. It also cleans core boxes and patterns. The low-cost newcomer will operate

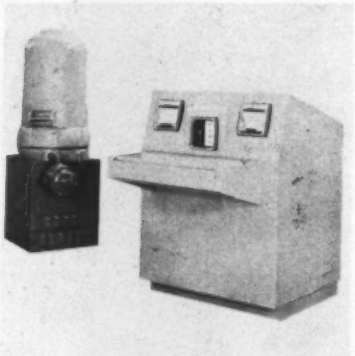


with any hard, dry abrasive material. It can be attached to existing air sources. Also, no special sand blasting rooms are necessary since the abrasive blast is confined to a small area. Just a simple drop cloth placed under the work permits re-use of the abrasive. The blaster comes complete with a pistol-grip gun, extra air jets and nozzles, six feet of sturdy hose (other lengths are optional) and a 12-quart capacity abrasive container. A durable hood and face shield are also included for the safety and comfort of the operator. (Frederic B. Stevens, Inc.)

For more data circle No. 69 on postcard, p. 123

Analyzes Gases

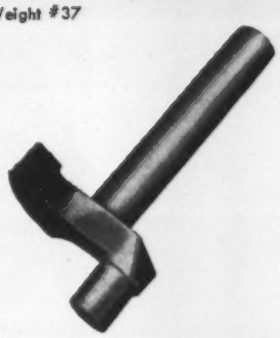
Featuring trend readout display for compatibility with automatic control, a new chromatographic



analyzer provides measurements of up to six components. These data serve as a basis for the control of process stream composition. Continuous measurement trends are monitored by two pneumatic re-

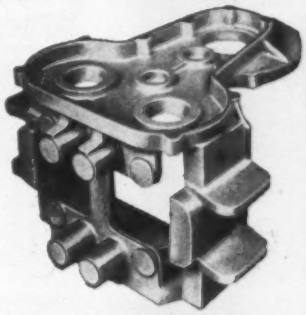
URICK'S DUCTILE IRON

Weight #37

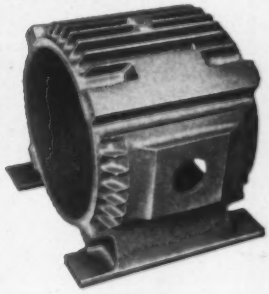


Weight #62

Weight #41



Weight #75



. . . PRODUCTION RUNS with a custom finish

URICK successfully casts many small parts or components of Ductile iron on a production basis.

Because of URICK'S team "know-how" and modern facilities, these precision castings are no longer considered a custom task involving added expense and time, but are mass produced with effective savings.

Naturally URICK'S knowledge of stress, strain, and impact values helps in recommending Ductile where it will serve best. Possibly you have components that URICK can help you convert to Ductile to your advantage.

Remember, castability, weight reduction and reduced machining time with longer tool life, all add up to real economies. Ask URICK about their Ductile recommendations before you decide on your next casting run.

URICK is the foundry that starts with "U" and stays with YOU. Write for bulletins on URICK'S Ductile and Urite casting facilities.

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With the help of quickly available extrusion specialists, more and more companies have discovered that they can now save substantially by replacing rolled, crimped, welded, machined and assembled parts with low-cost aluminum extrusions.

Have a nearby independent extruder analyze your own product line right away. And consult him regularly from now on. The chances are excellent that with his specialized up-to-date knowledge of extrusions he can help you make major savings.

A helpful product analysis is just one reason, however, for calling on an independent extruder. *Fast service* is another. He's at hand when you need him. Your order is important to him. And it doesn't have to wait for hundreds of others.

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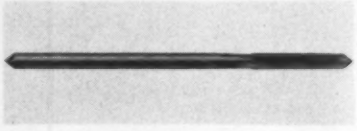
NEW EQUIPMENT

corders. Each logs the concentration of three components. Sharp peak definition results from the use of a unique sampling valve which delivers a uniform slug of sample gas to the column for each analysis. There's also a special annular slide that's spring loaded to prevent carrier gas from leaking into the sample. As a result, time lag and dead space are held to a bare minimum. Columns are U-shaped, rather than coiled, with 30 U-tubes divided into two crescents of 15 tubes each. Easy to pack, clean and repack, the tubes can be field connected to produce any column arrangement up to 40 feet. (Foxboro Co.)

For more data circle No. 70 on postcard, p. 123

Solid Carbide Reamers

Two new series of solid carbide, four-flute reamers have been added to an extensive line of solid carbide tools. Called "Micro Reamers", these miniature tools are available



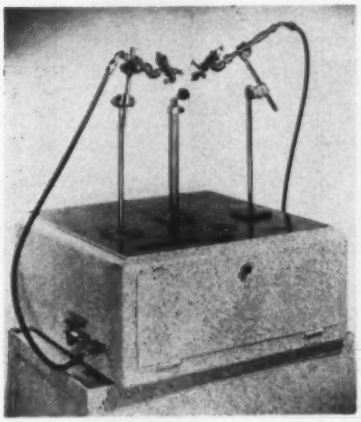
in eight fractional sizes from 1/64-⅛ in. in diameter, and in decimal sizes ranging from 0.0151-0.115 in. All have reamer diameter tolerances of + 0.0001- + 0.0003 in. All are straight-flute design with precision-ground lands to guarantee uniform, precise hole tolerances and long reamer life. They're recommended for all materials including steels up to Rc 56 in hardness. (The Atrax Co.)

For more data circle No. 71 on postcard, p. 123

Paints Fade-Out Effect

Here's a new machine that provides automatic, controlled, and uniform painting of irregular or fade-out patterns. It's a small and portable bench-type unit, 24 x 24 in., known as the "Snap-Tap" painting machine. In ordinary use, no masks are necessary but the unit can be adjusted for their use if desired. The machine has two spray guns which

are adjustable vertically, horizontally, or to any angle. The guns are actuated by a snap-tap of the palm button. The control of the coating

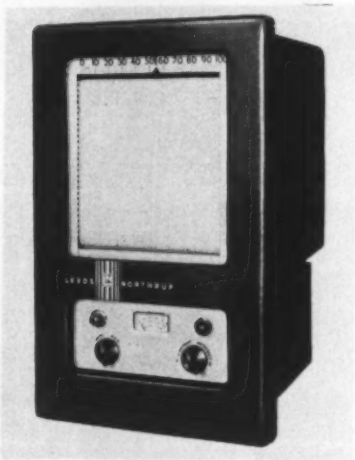


quantity, and the length of the spraying cycle are also adjustable. Work holders, designed for the particular piece part, are demountable. This gives the machine flexibility for handling an unlimited number of small parts. (Conforming Matrix Corp.)

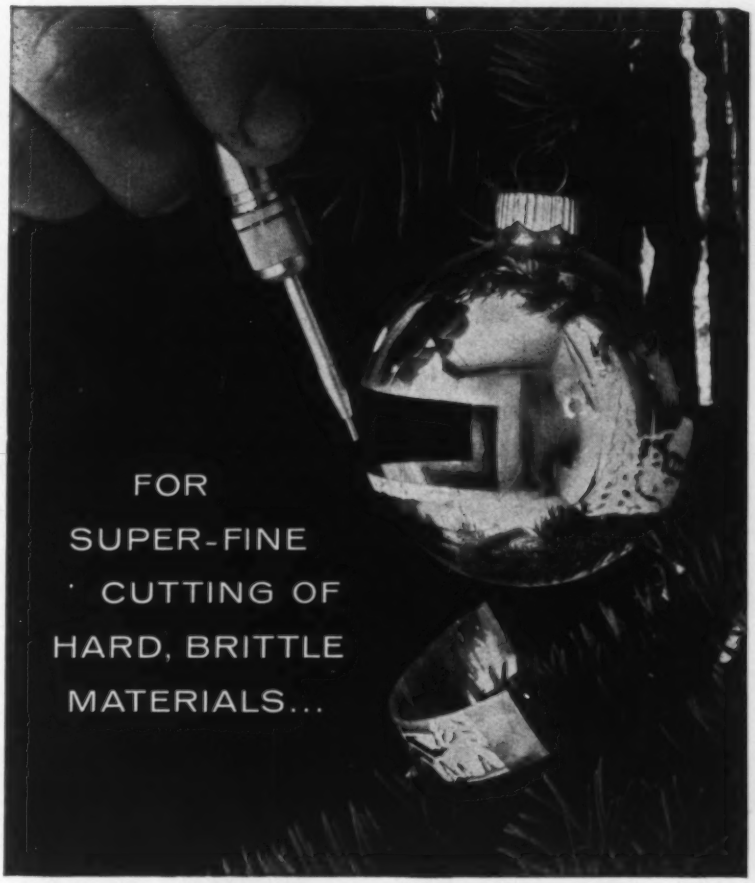
For more data circle No. 72 on postcard, p. 123

Controls the Heat

Close temperature control of a wide variety of continuous or batch electric furnaces is afforded by a new current - adjusting controller. Designed primarily for jobs requiring uninterrupted electric heat input, the controller provides proportional, re-



set and rate actions. These actions continuously adjust heat input to a furnace according to size, duration, and speed of temperature changes. The system is complete, easily installed and easily maintained. It



THE S. S. White Industrial Airbrasive® Unit

It may seem a Scrooge-like trick to slice up this Christmas decoration, but we think you will agree that it is a good demonstration of the ability of the Industrial Airbrasive Unit to cut fragile, brittle materials.

This unique tool is doing jobs that were up to now thought impossible. A precise jet of abrasive particles, gas-propelled through a small, easy-to-use nozzle, cuts or abrades a wide variety of materials such as germanium, fragile crystals, glass, oxides, ceramics, and many others.

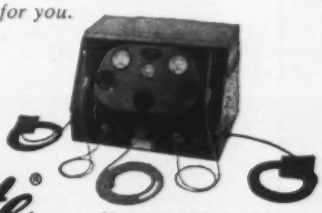
Use it to make cuts as fine as .008"... or remove surface coatings without affecting base material... wire-strip potentiometers... deburr precision parts... adjust printed circuits... in the laboratory or on an automated production line.

Important too: *the cost is low*... for under $1,000 you can set up your own Airbrasive cutting unit!

Send us your most difficult samples and we will test them for you.

1096

SEND FOR BULLETIN 5705A ...complete information



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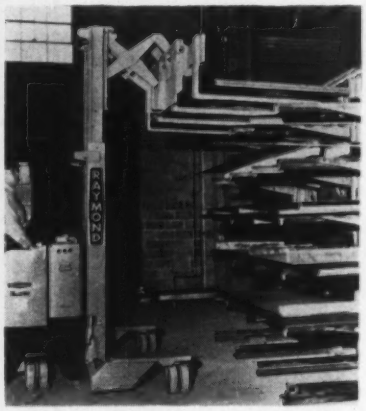
consists of a primary element, an indicating or recording controller, a magnetic amplifier, a power control device and a panel if required. (Leeds & Northrup Co.)

For more data circle No. 73 on postcard, p. 123

Four-Way Fork Truck

A new four-directional fork truck can move forward, backward or sideways, left and right from a standing start, because it has hydraulically-controlled wheels. In operation, the truck moves forward in the conventional manner down a wide center access aisle with the long load carried across the forks. When it arrives at the storage area, the truck's wheels are positioned for sideway operation and the truck moves into a narrow storage aisle. The elevating forks are then raised and extended to place the load in racks. No extra aisle space is required for maneuvering the truck into position at any time. This new model is mounted on a heavy-duty, 24-v power unit with single wheel drive, power steering, and a high-pressure hydraulic system. Other

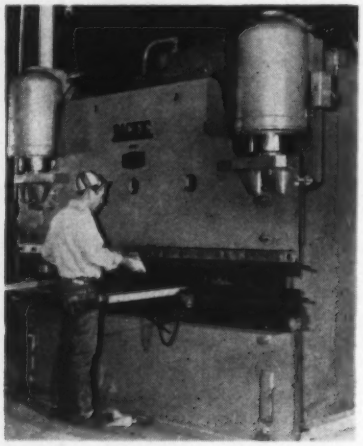


models are offered in 2000- and 3000-lb capacities with or without the "Reach Fork" attachment. (The Raymond Corp.)

For more data circle No. 74 on postcard, p. 123

Versatile Press

Only 20 trailer-frame channels were ordered on a recent contract job, yet 10 different sets of widths, lengths and thicknesses of metal were called for. Specifications were rigid: accuracy to 1/64 in., and absolutely square corners. Channels had to line up perfectly. By a simple 3 in. adjustment of a new press brake's stroke length, bends to .002 in. accuracy were formed in thick-



nesses ranging from 10 gage sheet to 1½-in. thick plate. With a 15 in. adjustment of the back gages, the hydraulic press brake formed the overall dimensions up to 12 ft. long and 2 ft. wide with precise accuracy.

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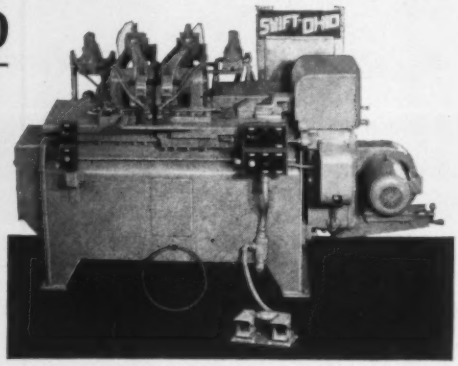

SWIFT OHIO No. 25 Flash Welder—designed for fully automatic production welding of automotive gear rings. Clamp fixtures align both ends of ring in a single motion. Rated 150 KVA.

SWIFT OHIO offers the only high speed production welding machines that provide for positive independent adjustment and alignment of electrodes—up—down—front or back.

The SWIFT OHIO Resistance Welder line is complete—proven through more than 35 years of service to the metal working and fabricating industry.

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MULTIPLE-OPERATION EQUIPMENT FOR WELDING, MACHINING, ASSEMBLY, SPECIAL MACHINERY

This control flexibility lets the new hydraulic press brake form cones, square to round transitions, pipe clamps, door frames, boxes and special angles. (Pacific Industrial Mfg. Co.)

For more data circle No. 75 on postcard, p. 123

Guards Against Fires

Fire-retardant paint is widely used on interior wood, fiberboard, acoustical tile and other combustible materials. It tends to minimize potential loss of life and expensive property damage in industrial manufacturing and storage areas. Applied very much like conventional decorative paint and costing very little more, a new intumescent paint is particularly useful in helping to

make older building firesafe without expensive reconstruction or broad-scale replacement of combustible interior materials. There are good reasons why. First, the inherent thermal insulating effect of the paint prevents heat distortion or loss of steel temper in roof beams or columns. Secondly, the fire-retardant paint does not flame or support the spread of flame or heat along its surface. Thus, it can be applied over welding partitions, metal bins and storage racks, and other non-combustible surfaces. These are the plant areas where fires are most liable to begin. Here's how the paint provides protection. Intumescent fire-retardant paint swells into a black, spongy cellular mat on exposure to heat or flame of 300°F or over. The spongy mat, which may expand to a layer as thick as ½ in.,

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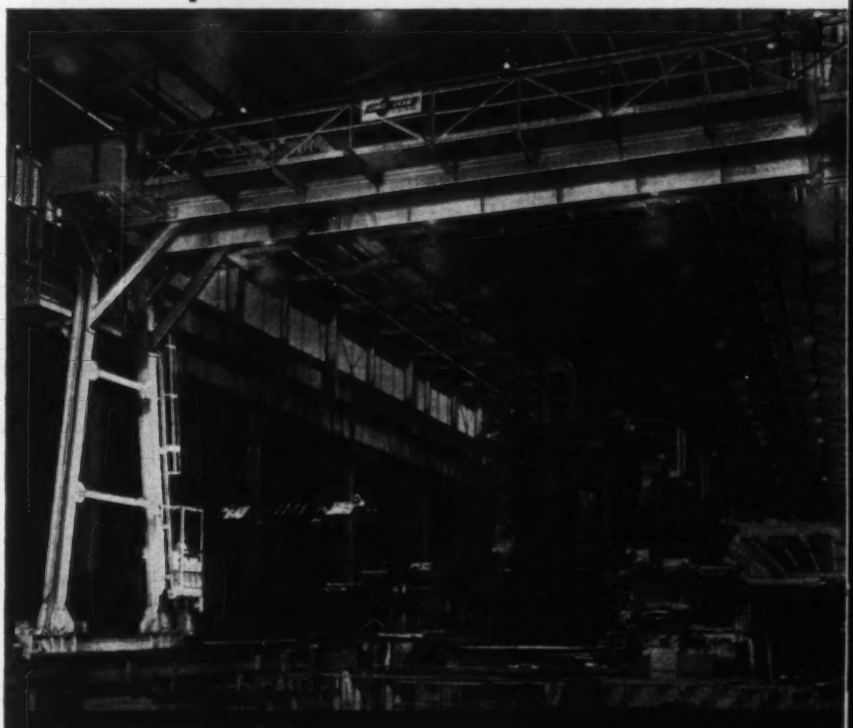
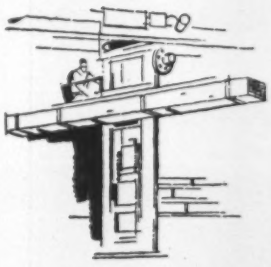


Conco Semi-Gantry Crane custom-engineered for service in a Chicago area steel mill

CRANES HOISTS CONCO



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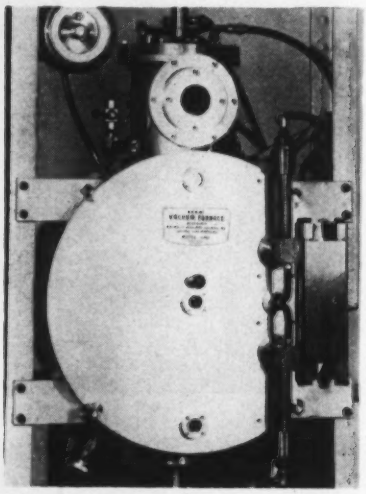
will only char at the point where heat or flame is applied. In addition, the thousands of minute air cavities in the mat form a protective heat insulation so that the temperature of the painted surface itself is much lower than that of the exposed surface of the mat. (Albi Mfg. Co., Inc.)

For more data circle No. 76 on postcard, p. 123

Physical-Test Furnace

For determining properties of high-temperature materials under high vacuum, a new testing furnace offers extremely-high temperature capacity as well as speed and ease of loading and unloading. With tantalum heating elements and



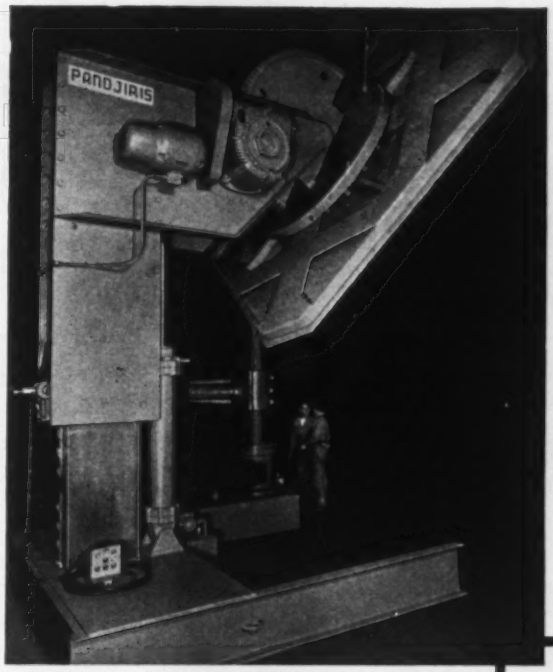
shielding, this vacuum furnace operates continuously at 2500°C (4532°F) at pressures in the 10^{-5} mm range. With graphite heating elements and shielding, it will test graphite materials in inert gas at temperatures up to 3000°C (5432°F). Because of the entire furnace's "clam shell" design, access to the hot zone is simple, convenient and fast. Made for use with standard tensile- and creep-testing machines, the furnace need not be raised or lowered in the machine. Instead it can be easily swung out of the way for room temperature testing. The regular heat chamber, which handles 1⅛ in. specimens, can be enlarged to take bigger ones if desired. Also, versatility of the

design and construction makes it easy to provide modifications for the special needs of any individual user. (Richard D. Brew & Co.)

For more data circle No. 77 on postcard, p. 123

Burnishes Fillets

This dual-head machine roll burnishes fillets on automotive front-wheel spindles and similar stub shafts. Two parts are processed at once, yielding 240 pieces per hour at 80 pct efficiency. The cold-working process efficiently and inexpensively eliminates fatigue failures at the fillets. Here's how: Two rollers contact the work. Each roller is of a special, patented design. The contact surfaces on the roller face oscillate back and forth across the fillet as they are forced against the rotating workpiece. This kneeding action of the rollers creates compressive stresses on the skin of the metal. These stresses are superimposed over tensile stresses formed in the fibers underneath. The resulting balance of controlled stresses



Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

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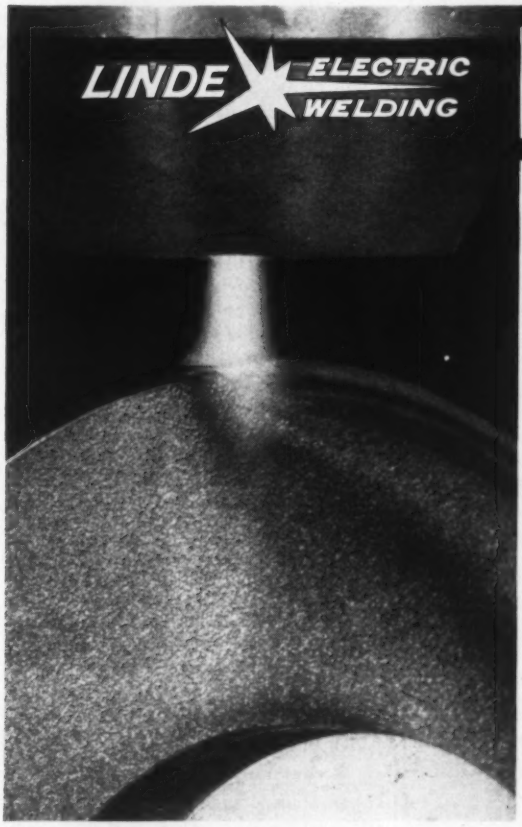

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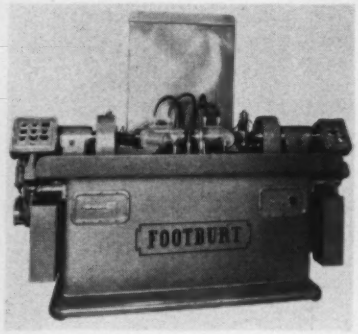
strengthens the fillet against fatigue failure. Of course, no polishing is done during the fillet-rolling process. Loose abrasive grit would be rolled

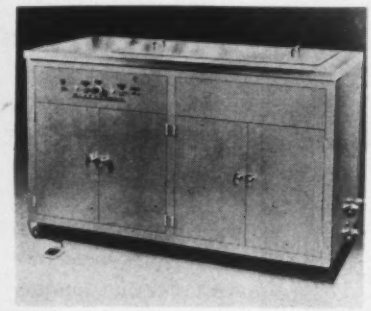


into the fillet—nullifying the value of the rolling. To eliminate heat and wear, the parts are cleaned carefully before rolling. For the same reasons, they're rolled in a flood of coolant. The special hardened rollers, when properly used, last for hundreds of thousands of parts. (The Foote-Burt Co.)

For more data circle No. 78 on postcard, p. 123

Ultrasonic Cleaner

Here's a new ultrasonic cleaning unit that cleans parts three ways. By stages, within the one unit, the part is first ultrasonically cleaned in heated Freon. It's then spray rinsed in Freon liquid. Rinsing in



Freon vapors winds up the process. In effect, powerful ultrasonic waves loosen all dirt—even in blind holes. This dirt is washed away in the two rinsing steps. The unit constantly circulates and filters the Freon while the vapors are condensed and returned to the circulating system. This keeps the Freon clean by distillation. (Blackstone Corp.)

For more data circle No. 79 on postcard, p. 123

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How Inventory Buildup Will Hit

User plans now reaching steel executives mean a 15 to 20 pct pickup in steelmaking.

Not all users are going to plunge into an inventory buildup. But a sales jam could occur. Quotas are already mentioned in the Midwest.

■ Steelmaking will take a 15 to 20 pct jump shortly after the first of the year. And this estimate will be on the conservative side if inventory building comes on top of a general pickup in business.

The 15 to 20 pct gain is based on known intentions of automakers and other major steel users to start building up their stocks of steel after the first of the year. There is no easing in labor tensions in the steel industry. As a result, strike hedging will be in progress early in 1962 and continue through June.

Short-Term Outlook—However, talk of a major buildup after Jan. 1 comes at a time when consumers are doing little to bolster the short-term market. The moderate improvement noted several weeks ago continues. But there is no major strengthening of the market for November and December.

Estimates on the November-December outlook indicate, at the most, a 10 pct pickup before the first of the year. If this occurs, it will be because some steel users start building their stocks earlier than the national pattern.

Inventory Plans—The inventory buildup looks like this: Some automakers have told their principal suppliers they will add at least one-sixth to their regular monthly take through the first six months of 1962. Right now, this looks to be conservative in that this would add only one month's steel requirements to user stocks. It's known that some steel users intend to go all out and build up from 60 to 90 days' supplies.

There are some users who say they do not intend to invest heavily in pre-strike inventories. Their belief is that President Kennedy would intervene at an early date to prevent a strike or to keep one to a minimum length. But barring a national emergency, Presidential intervention, either direct or indirect, would not prevent a strike if key issues are not resolved.

Well Planned—Indications from major steel users point to a more orderly buildup of steel stocks in 1962 than in 1959. The memory of costly conversion arrangements and millions of dollars tied up in orders of foreign steel still haunt consumers who waited too long in 1959 and paid a high price to keep working through the steel strike.

Steel mills are doing what they can to avoid a second quarter '62 jam-up if panic buying starts. In the Midwest, there is already talk of quotas for the first half of next year. While this may be a little premature, some customers, when talking about much larger orders than normal in the second quarter '62, were told their demands were out of line.

Whether there is a real jam-up depends on the economy. If business starts to pick up strongly, attempts to build up steel while consumption is increasing will cause trouble. Then, too, a period of inventory building tends to feed on itself by generating improved business across the economy.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	102	108	111	81
Buffalo	97	101	103	78
Pittsburgh	103	104	105	74
Youngstown	100	94	100	66
Cleveland	115	120	115	92
Detroit	147	136	112	100
Chicago	112	110	108	80
Cincinnati	138	133	128	78
St. Louis	125	128	128	80
Southern	103	101	111	81
Western	110	116	117	78
U. S. Index	109.8	109.7	109.6	78.9

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,046	2,044	82,811	88,972
Ingot Index				
(1957-59=100)	109.8	109.7	98.8	106.1
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$32.83	$32.83	$38.83	$28.33
No. 2 bundles	$23.50	$23.18	$25.83	$18.50

Buyer Gets Bigger Quality Role

A new quality control approach stresses prevention of defects. It pulls buyers into supplier plants.

Lower prices and lower inventory costs results from the new approach.

■ A new approach to quality control may be pulling the purchaser more deeply into the supplier's plant and vice versa.

This concept stresses prevention of defects in purchased goods rather than just detection. It calls for broader contact and understanding in both directions along supply lines.

Some government agencies have carried this notion to the point where there is no inspection of incoming materials. Instead, quality is assured by setting controls on the supplier's production. Several of the aircraft companies are down to where they inspect only one piece in a lot to determine quality.

Many Plans — And one large drug company for years has used a broad supplier-contact plan where even research engineers exchange plant visits. The company carries its defect-prevention efforts as early as the "product conception" stage.

One result of the program has been greater teamwork between buyer and seller.

An overall result of programs of broad supplier contact has been that buyers, in companies involved, play key roles and their own duties are broadened.

The Program—One of the first to apply the basic doctrine of preventive control was the Atomic Fuel Dept., Westinghouse Electric Corp. The Atomic Fuel program, which was started several years ago, was described recently by Frank Caplan, Jr., manager of quality control of the department. Speaking at a Pittsburgh meeting of ASQC, Mr. Caplan said the program involves these essentials:

CAPLAN: Don't detect. Prevent.

Direct contact between quality and engineering people at the receiving plant and manufacturing men at the vendor plant.

An inspection system that pinpoints poor quality and tells the vendor exactly where he went wrong.

Before this system was installed, said Mr. Caplan, inspection at the plant followed the line of "use it if you need it—reject it if you dare." The vendor got only a general playback through purchasing on his performance. A supplier might never find out he was providing sub-standard material.

Defects Classed — To improve quality, the plant began a systematic review of problem areas. The performance of vendors was tabulated. Four classifications of defects were established, ranging from critical down to incidental. Quality standards were reworked and in many cases, relaxed.

Armed with new standards and precise identification of problem areas, the plant then had purchasing arrange meetings with major vendors. These sessions brought together teams of quality, design and manufacturing engineers from both sides of the fence. They served, said Mr. Caplan, to cut through misconceptions and blind spots. Quality improved; a number of vendors asked that meetings be continued on a regular basis.

The regular quality control program was then organized along these starting lines. Using a streamlined inspection technique, the plant recorded defects according to the classifications set up. The performance of each vendor was tabulated. Regular reports told suppliers exactly how they were doing.

In addition, purchasing arranged for quality control men to visit supplier plants and help in licking problems. As an example, the Atomic Fuel Dept. recently sent an engineer to a foundry to instruct on the preparation of radiographs.

Lower Costs—All this has paid off in less inspection time for the plant and lower inventory costs because of lower rejection rates. It has helped suppliers reduce costs and this has tended to reduce prices.

There are many reasons for broad, systematic communications between supplier and purchaser, said Mr. Caplan. For one thing, suppliers may have trouble deciding which dimensions are critical just from a blueprint. Direct contact with the design engineer can get across the important aspects of the finished product.

Also, said Mr. Caplan, many vendors simply don't read specifications until they get rejections. The big point of the new system is to head off rejections.

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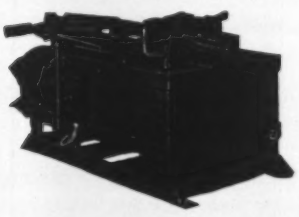

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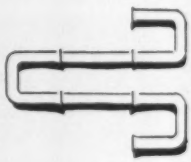
FOR EXAMPLE



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QUALITY WITH SERVICE

Market Marks Time Awaiting Buildup

Steel users are making plans to step up their buying after 1962 begins.

But, meanwhile they are cautious about ordering. Mills work hard to keep rolling schedules filled.

▪ Until the wave of inventory building comes, the market is marking time.

Users are waiting as long as possible before placing orders. Lead times are at a minimum. Mills often can't estimate the month's tonnage until late orders come in.

Despite any plans to boost stocks early in 1962, customers are cautious about present ordering.

Cautious Optimism—The result: Many mills expect November and December orders will about equal October's. Some are a little more optimistic. They point to a slight improvement in the buying of plates, shapes, piling, tube rounds and other products.

Producers depending heavily on sales to the auto market are uncertain about fourth quarter prospects. Some feel November shipments will top October with another gain coming in December. But others believe this market is drifting sideways. Until the automakers step up steel buying, these mills see little chance for any great improvement.

Sheet and Strip—Auto sheet demands are showing no lift. Some mills believe an increase in auto production will increase auto industry orders for steel. But, as yet, there's little indication that December ordering will top November.

In **East Coast** markets, specialty products, including silicon and electric sheets, are faltering a bit. Galvanized sheet remains at about 6 to 8 weeks delivery. At **Cleveland,** mills report sheet order intake for November has been only average. Shipments are not even certain to reach September or October levels, some producers say. Sales to the appliance industry are very slow.

Mills in the **Chicago** area also report both auto and appliance industry buyers are not increasing tonnages. Some sheet grades in the **Midwest** are on 2-3 week delivery.

However, some buyers have already indicated the amount they'll increase tonnages in the first half of '62. In a few cases the mills pointed out these projected demands were way out of line. This lead to talk that the mills had clamped on a quota system for the first half.

Bars—Many mills are operating at 18 turns or more a week. This is not near capacity operations, but it's enough to keep them busy. A rush of strike hedge buying by auto and truck makers and their suppliers could stretch out bar mill cycles. There's also the prospect that ordnance orders for shell quality and forging quality bars will tighten the market.

PURCHASING AGENT'S CHECKLIST

Freight transport situation changes as Ohio River Valley gets major face lift. P. 77

Tool and die prices are expected to increase. P. 84

How to automate your materials handling operations. P. 107

At **Pittsburgh,** November mill bookings are running a little better than October's. Some buyers are placing inventory orders for December, but this is not general.

In the **Midwest,** there are gaps in mill rolling cycles, indicating that bar orders are falling off.

Plates and Shapes—Along the **East Coast,** plates are a little stronger after faltering slightly in October. However, sheared mill plate is still readily available in three weeks. Structurals are moving fairly well, but seasonal factors are beginning to slow down sales. Imports are still a big factor in the market. Foreign-made shapes sell about $20 a ton under U. S. prices. They can be delivered in 6 to 8 weeks, compared with 4 weeks for domestic products. In **Pittsburgh,** a mill reports a 10 pct increase this month in orders for plates, shapes, and piling.

Wire Products—There are a few cases of inventory building, but the trend is not widespread. Manufacturers wire is pacing the market. Construction wire products are starting to dip seasonally. Merchant products are slow.

Eastern mills say buyers are inquiring about the level of business, but often the interest doesn't result in orders. The mills believe buyers are probing the market before making first quarter plans.

Wire mill operations in the **Midwest** are running at the level in effect for some time. Losses in merchant wire are offset by gains in sales of manufacturers wire.

Pipe and Tubing—Standard pipe and oil country seamless are holding at about August-September levels. Linepipe is off seasonally. Oil producers are expected to begin their inventory buildup sometime in the next two months.

Tinplate—Shipments of tinplate have declined seasonally. Orders on the mills are also low, but running well ahead of October. A **Pittsburgh** producer now feels the fourth quarter will be about 5 pct better than predicted.

COMPARISON OF PRICES

(Effective Nov. 13, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Nov. 13 1961	Nov. 6 1961	Oct. 16 1961	Nov. 15 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Nov. 13 1961	Nov. 6 1961	Oct. 16 1961	Nov. 15 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.11
Foundry, South Cin'ti.	71.92	71.92	71.92	71.92
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	69.61
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. Cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig Iron	$66.44	$66.44	$66.44	$66.32
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$33.50	$33.50	$37.50	$26.50
No. 1 steel, Phila. area	33.50	33.50	40.50	33.00
No. 1 steel, Chicago	31.50	31.50	38.50	25.50
No. 1 bundles, Detroit	29.50	29.50	33.50	21.50
Low phos., Youngstown	37.50	37.50	41.00	28.50
No. 1 mach'y cast, Pittsburgh	44.50*	45.50	45.50	45.50
No. 1 mach'y cast., Phila.	47.50	47.50	49.50	47.50
No. 1 mach'y cast., Chicago	44.50	44.50	48.50	41.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$32.83	$32.83	$38.83	$28.33
No. 2 bundles	23.50*	23.18	25.83	18.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper electrolytic, Conn.	$31.00	$31.00	$31.00	$30.00
Copper Lake, Conn.	31.00	31.00	31.00	30.00
Tin, Straits, N. Y.	123.50†	123.125**	121.50	103.625
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	9.80*	10.30**	11.00	11.80
Aluminum, ingot	24.00	24.00	24.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡Average. ** Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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*Appears in the Nov. 9-Nov. 23 issues

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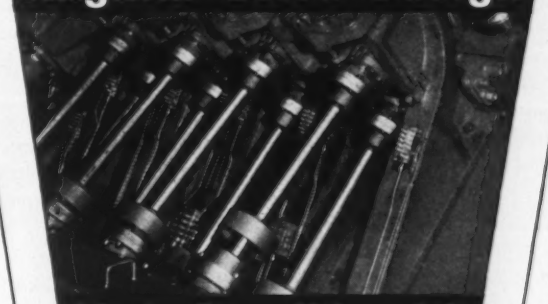

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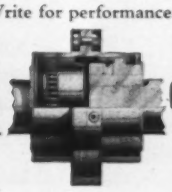

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Prices May Start To Level Off

Most dealers expect further price declines before the scrap market picks up again.

But many feel the bottom is near. The market is drifting now with little hope for a sustained recovery until early in '62.

■ The scrap market is drifting this week. Prices remain weak. But they are steady for the moment, after six straight weeks of decline.

Dealers across the country feel prices have not yet reached a levelling-off point. Many feel the bottom is near. But most expect further price drops before the year's end.

At the new low prices there has been some activity. But mills are still selective and cautious. Scrap dealers figure mill demand won't pick up until stockpiling for a possible mid-summer steel strike starts.

Export remains completely dormant. Export prices are slumping to new lows. Little activity is expected until late January when orders should start coming in for the spring shipping season.

The Iron Age composite price for No. 1 heavy melting is steady at $32.83 this week, after falling for four straight weeks. The No. 2 bundles composite price advanced to $23.50, from $23.18, on the basis of a price change in Chicago.

Pittsburgh—Prices of most grades are unchanged in a quiet market. Brokers feel there may still be room for a downward adjustment of industrial prices but that the dealer market is at the bottom or close to it. For brokers, No. 1 railroad heavy melting went for more than $39 and specialties brought more than $45. While export demand was a factor in railroad bidding, prices are considered surprisingly strong. In the dealer market, a mill purchase has confirmed the price of low phos. at $42. No. 2 bundles have moved at $25.

Chicago—Prices firmed as market volume continued low. A large factory list moved at going price levels, pegging the No. 1 factory bundle price at $36. No. 2 dealer bundles continued to tighten and new efforts to establish a $22 price failed, while new orders were written to cover a $23 price. Differentials between grades are moving in a more normal path. Yards continue to lay down scrap, and there is the feeling that export material will begin to be accumulated at current prices.

Philadelphia—Dealers report little activity after last week's $4 price drop in prime steelmaking grades. There has been some repeat business on the new prices. But generally trading is at a standstill. Only one mill in the district is buying, cautiously and in restrictive amounts.

New York—Several of the major dealers, who had left the market when prices tumbled sharply several weeks ago, are back in. They are scrambling for what little export business is around. Prices are a bit more stable though still very weak. There seems to be no clear cut optimism or pessimism apparent among dealers.

Detroit—The market is calm and quiet. It is believed the calm will remain through November. Outlook for December is for industrial lists to show a status quo. Mills want to balance inventories before making year-end personal property tax statements; thus Dec. looks slow.

Cleveland — It's a quiet and steady market. No. 1 railroad heavy melting is off $1 on the basis of bidding on a late list. A local purchase has confirmed the price of foundry steel.

Cincinnati — Brokers report a stronger tone to the market. There is no new buying, and there have been no price changes. There is more active interest in scrap but sellers are reluctant to make commitments at present levels.

St. Louis—The market remained unchanged this week, and many dealers are saying bottom may have been reached. Suppliers are reported strongly resisting lower prices. Little scrap is moving into the yards. Although some mill buying is going on, it's at their prices and in small tonnages.

Birmingham—The general situation remains unchanged. Buying is slow despite the attraction of low prices. Dealers are not expecting price increases for a month or so, although orders are expected to pick up after the first of the year. There is no export business.

Buffalo — Market is very quiet this week with little or no activity. Prices are unchanged. Dealers look for some change in the next week.

Boston—The market tends to be weak but there are no price changes. Domestic and export business is off.

Houston—Prices have remained steady during the past week, but there are undertones of weakness. District mill reports the flow of scrap has been heavy.

West Coast—Price weakness continues even at the new, reduced schedule. The entire list again fell $1 to $2 per ton. Most dealers expect lower prices next month.

SCRAP PRICES *(Effective Nov. 13, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	34.00 to 35.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	29.00 to 30.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	49.00 to 50.00
RR specialties	44.00 to 45.00
No. 1 machinery cast	44.00 to 45.00
Cupola cast	36.00 to 37.00
Heavy breakable cast	32.00 to 33.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	80.00 to 85.00
410 turnings	50.00 to 55.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	42.00 to 43.00
Low phos. punch'gs plate, ¼ in. and heavier	41.00 to 42.00
Low phos. 2 ft and under	38.00 to 39.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	55.00 to 57.00
Rails 2 ft and under	47.00 to 48.00
Angles and splice bars	40.00 to 41.00
RR steel car axles	53.00 to 54.00
RR couplers and knuckles	40.00 to 41.00
No. 1 machinery cast	44.00 to 45.00
Cupola cast	37.00 to 38.00
Cast iron wheels	33.00 to 34.00
Malleable	42.00 to 43.00
Stove plate	31.00 to 32.00
Steel car wheels	38.00 to 39.00
Stainless	
18-8 bundles and solids	165.00 to 170.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	80.00 to 85.00
430 turnings	45.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	12.00 to 13.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	38.00 to 40.00
Low phos. 2 ft punch'gs	40.00 to 41.00
Elec. furnace bundles	39.00 to 40.00
Heavy turnings	26.00 to 27.00
RR specialties	40.00 to 41.00
Rails, 18 in. and under	48.00 to 49.00
Cupola cast	38.00 to 40.00
Heavy breakable cast	38.00 to 39.00
Cast iron car wheels	40.00 to 41.00
Malleable	47.00 to 48.00
No. 1 machinery cast	47.00 to 48.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.50 to $32.50
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	32.50 to 33.50
No. 2 bundles	18.00 to 19.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	39.00 to 40.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast	34.00 to 35.00
Heavy breakable cast	29.00 to 30.00
Drop broken cast	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$35.50 to $36.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	21.00 to 22.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	32.50 to 33.50
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	32.50 to 33.50
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	37.00 to 38.00
Low phos. punch'gs plate	33.50 to 34.50
Drop forge flashings	32.50 to 33.50
Foundry steel, 2 ft & under	32.50 to 33.50
No. 1 RR hvy. melting	35.00 to 36.00
Rails 2 ft and under	45.00 to 46.00
Rails 18 in. and under	46.00 to 47.00
Steel axle turnings	24.00 to 25.00
Railroad cast	42.00 to 43.00
No. 1 machinery cast	43.00 to 44.00
Stove plate	37.00 to 38.00
Malleable	48.00 to 49.00
Stainless	
18-8 bundles	160.00 to 165.00
18-8 turnings	95.00 to 100.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. plate	35.00 to 36.00
Structural and plate, 2 ft and under	37.00 to 38.00
Rails 2 ft and under	48.00 to 49.00
Scrap rails, random lgth.	38.00 to 39.00
No. 1 machinery cast	44.00 to 45.00
No. 1 cupola cast	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
Foundry steel, 2 ft	28.00 to 29.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	13.50 to 14.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	34.00 to 35.00
Rails random lengths	38.00 to 39.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	38.00 to 39.00
Cupola cast	34.00 to 35.00
Heavy breakable cast	31.00 to 32.00
Stove plate	30.00 to 31.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	53.00 to 54.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Bar crops and plate	41.00 to 42.00
Structural and plate, 2 ft.	40.00 to 41.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	44.00 to 46.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast	38.00 to 39.00
Stove plate	38.00 to 39.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	29.00 to 30.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	15.00 to 16.00
Mixed bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast	37.00 to 38.00
Mixed yard cast	34.00 to 35.00
Heavy breakable cast	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	26.00 to 27.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast	27.00 to 28.00
Mixed cupola cast	29.00 to 30.00
Automotive cast	40.00 to 41.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	75.00 to 80.00
430 bundles and solids	65.00 to 70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	3.00 to 4.00
Shoveling turnings	8.00 to 9.00
Clean cast. chem. borings	17.50 to 18.50
No. 1 machinery cast	38.00 to 39.00
Mixed cupola cast	30.00 to 31.00
Heavy breakable cast	30.00 to 30.50

San Francisco

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	25.00 to 26.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	12.00 to 13.00
Cast iron borings	12.00 to 13.00
No. 1 cupola cast	47.00 to 48.00

Los Angeles

No. 1 hvy. melting	$35.00 to $36.00
No. 2 heavy melting	30.00 to 31.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Elec. furnace 1 ft and under (foundry)	44.00 to 45.00
No. 1 cupola cast	45.00 to 46.00

Seattle

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 2 bundles	21.00 to 22.00
No. 1 cupola cast	34.00 to 35.00
Mixed yard cast	29.00 to 30.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$30.00
No. 2 hvy. melting cut 3 ft and under	27.00
No. 1 dealer bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Bush., new fact., prep'd.	30.00
Bush., new fact., unprep'd.	24.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	30.00
No. 2 bundles	21.00
Machine shop turn.	12.00
Shoveling turnings	15.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast	36.00 to 37.00
Heavy breakable cast	28.00 to 29.00

Copper Upswing Boosts 1962

Commerce Dept. estimates 1961 copper deliveries will top last year by a narrow margin.

Carryover of the upward trend should help get next year off to a good start.

An upward swing has started in copper that could easily get 1962 off to a roaring start. The copper Div., of the U. S. Dept. of Commerce estimates deliveries from brass mills, copper wire mills and foundries will top 1960.

Looking Ahead — Although no one is predicting next year's business, the trend appears to have started, with the industry as beneficiary. The Commerce Dept. estimates the '61 figures will not be too far ahead of last years, hence the upturn continuing into next year is the most significant part of the forecast.

Latest available figures are from the second quarter. They show brass mill deliveries to consumers at 585 million lb, up sharply from the first quarter's 473 million lb.

Fourth Quarter—E. J. Talbert, chief of program and requirements branch of Copper Div., puts deliveries during the third quarter of this year at about 475 million lb. He estimates the fourth quarter at 530 million lb, for a yearly total of 2.063 billion lb. Last year's total was 2.042 billion lb.

There is no doubt that the final total for this year will be above Mr. Talbert's projection, for this reason: His actual delivery statistics include imports, his projections do not.

Imports — Mr. Talbert reports brass mill imports during July were 9.3 million lb; they are higher than the average for the first six months, 8.4 million lb. This means that roughly 50 million lb must be added to the projection for 1961 to get a true comparison with last year.

Thus the fourth quarter shapes up well despite traditional inventory reduction by customers for tax purposes. The final quarter is estimated only slightly under the second quarter.

Cause of Uptrend — It appears likely that brass mill imports this year will just about match 1960, which means the difference in deliveries, and the general uptrend, can be attributed to domestic mills.

The forecast for wire mill deliveries, including imports for only the first half, in 1961 is 1.55 billion lb. Foundries and powder mills production is estimated at 863 million lb.

Overall Appraisal—Mr. Talbert forecasts a 3-to-5 percent improvement in 1961 business over last year. In his appraisal he includes several optimistic factors: Increased automotive production, inventory replenishment, expenditures for equipment and plant expansion, as well as a forecasted rise in housing starts.

Zinc

As sales rise, stocks are declining in the zinc industry. Latest statistics from the American Zinc Institute show unsold stocks at the smelters took another tumble during October.

This is the seventh straight month that smelters sold more than they made; it brings stocks down to their lowest point in the last 18 months.

More Cutting — Unsold stocks now total 150,083 tons. At the current rate of shipments this is about a 6 weeks supply. Smelters generally think there is still room for more cutting.

Generally, although smelters aren't boasting about business this year, they are happy with the trend. Deliveries in October hit 96,383 tons, notably better than any month in 1961 or 1960.

Lead

A leading smelter dropped the lead price early this week by ½¢ per lb. New prices: 10¢ per lb at New York, 9.80¢ per lb at St. Louis.

The market continues to be very weak, so other sellers are likely to go along with the new prices. It is too early to judge the effect of the second price cut in two weeks. But generally, the trade doesn't expect this lower price to entice any more buyers into the market.

Tin Prices for the Week

November 8—123.00; November 9—123.625; November 10—123.625; November 13—123.50.*
*Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum ingot	24.00	26.00	9/25/61
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	9.80	10.30	11/13/61
Lead, N. Y.	10.00	10.50	11/13/61
Magnesium ingot	38.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 163.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)
("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	47.4	46.4	45.4	44.4
5052	54.8	52.0	49.8	46.8
6061-0	53.0	50.3	48.4	47.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/64-5/16	11/64-23/64	3/4-1 1/16	1 3/64-1 3/4
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated
(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	93		

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Munts Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod..... 34.77

TITANIUM

(Base 30,000 lb. f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb) ..$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz..$ 2.25
Iridium, dollars per troy oz. ...$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz. ..$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per pg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
- 0.30 copper max. 23.25-23.75
- 0.60 copper max. 23.00-23.50

Piston alloys (No. 132 type) ..25.00-26.00
No. 12 alum. (No. 2 grade) ..21.25-21.75
108 alloy 21.75-22.25
195 alloy 24.25-24.75
13 alloy (0.60 copper max.) ..23.00-23.50
AXS-679 (1 pct zinc) 21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 22.75-23.75
- Grade 2—92-95% 21.50-22.50
- Grade 3—90-92% 20.50-21.50
- Grade 4—85-90% 19.50-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23¼
Comm. bronze	24⅜	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26¾
- No. 2 copper wire 24¾
- Light copper 22½
- *Refining brass 23½
- Copper bearing material 22½

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26¾
- No. 2 copper wire 24¾
- Light copper 22½
- No. 1 composition 24
- No. 1 comp. turnings 23½
- Hvy. yellow brass solids 17½
- Heavy yellow brass turnings 16½
- Radiators 20

Aluminum

Mixed old cast.	12	—12½
Mixed new clips	14	—14½
Mixed turnings, dry	13	—13½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	23½	—24
No. 2 copper wire	21½	—22
Light copper	19¼	—19¾
Auto radiators (unsweated)	16¼	—16½
No. 1 composition	20½	—21
No. 1 composition turnings	20	—20½
Cocks and faucets	16¾	—17¼
Clean heavy yellow brass	14¼	—14¾
Brass pipe	16½	—17
New soft brass clippings	18¼	—18¾
No. 1 brass rod turnings	16	—16½

Aluminum

Alum. pistons and struts	6½	— 7
Aluminum crankcase	9	— 9½
1100 (2s) aluminum clippings	11¼	—11¾
Old sheet and utensils	9	— 9½
Borings and turnings	4	— 4½
Industrial castings	8¾	— 9¼
2020 (24S) clippings	10	—10½

Zinc

New zinc clippings	5	— 5¼
Old zinc	3	— 3¼
Zinc routings	1¾	— 2
Old die cast scrap	1¾	— 2

Nickel and Monel

Pure nickel clippings	56	—58
Clean nickel turnings		43
Nickel anodes	56	—58
Nickel rod ends	56	—58
New Monel clippings	26	—26½
Clean Monel turnings	18½	—19
Old sheet Monel	25	—25½
Nickel silver clippings, mixed.		20
Nickel silver turnings, mixed.		17

Lead

Soft scrap lead	6½	— 7
Battery plates (dry)	2½	— 2¾
Batteries, acid free	1¾	— 2

Miscellaneous

Block tin	90	—92
No. 1 pewter	65	—67
Auto babbitt	46	—47
Mixed common babbitt	10	—10½
Solder joints	15	—15½
Small foundry type	9	— 9½
Monotype	9¼	— 9¾
Lino. and stereotype	8½	— 8¾
Electrotype	8	— 8¼
Hand picked type shells	5¾	— 6¼
Lino. and stereo. dross	1¾	— 2¼
Electro dross	2½	— 3

(Effective Nov. 13, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

Electro-galvanized-plus galvanizing extras

(Effective Nov. 13, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Cokes^ *1.25*-lb. base box	Electro^^ *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ^ COKES: 1.50-lb. add 25¢. ^^ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—*7.85 U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; *7.95 G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3, Y1,*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢. †† 7.425 at Sharon; Niles is 7.225.

(Effective Nov. 13, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*		7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, W13*		9.025 *A5, C13,W13*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,W13*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Nov. 13, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
W13 Western Cold Drawn Steel, Div. of Standard Screw Co., Elyria, O.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.36	10.16	11.35	9.70	9.95	9.75	11.80	17.48	16.48	21.58	20.83
Birmingham		9.11	11.00	11.39	10.10	9.06	9.12	8.91	13.14	18.84	16.65	22 94	22 19
Boston**	.10	10.00	10.50	11.87	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	8.20	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.63	12.85	18 59	16 68	22 69	21 04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.49
New York**	.10	9.91	10.44	11.64	13.67	9.99	10.45	10.15	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.99	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	17.75	17.85	21.58	22.15
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.63
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64	.....	16.69	21 79	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 12e zinc. [2] Deduct for country delivery. [1] 15 ga. & heavier; [3] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Nov. 13, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bardsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R5*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *III*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.00	66.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *HI*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

	Pct
Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25-26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00-31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	42.25	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25-29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown. *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6*; Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan. *A5*; Canton, O., *T5, R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including ¼"*).

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago. *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown. *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*: Claymont, Del; *P2*.

Forging billets: Ambridge Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mill.

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Nov. 13, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	....	212	193	9.00	9.55
Aliquippa *J3***	173	190	.....	.....	190	9.00	9.675
Atlanta *A8***	173	191	....	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	192	....	214	198	9.10	9.80
Donora Pa. *A5*	173	187	....	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	....	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	....	217	198	9.25	9.80†
Jacksonville *M4*	175	192	....	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	....	196	9.00	9.675
Joliet Ill. *A5*	173	187	....	212	193	9.00	9.55
Kokomo *C9**	175	189	....	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	....	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
Sparrows Pt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Net-Ton	
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.70
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

CONTROL

New! The most reliable limit switch ever developed

(from Cutler-Hammer, of course)

The serious problem of limit switch failures has now been greatly reduced thanks to Cutler-Hammer's new oiltight limit switch. Under test conditions much tougher than in actual production, our limit switches have lasted far longer than any other brand.

It fits almost anywhere and in any position. Change lever motion quickly in the field. No other switch sealed more effectively. Get facts in PUB. ED-143-W246.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Cutler-Hammer Canada, Ltd.; Cutler-Hammer Mexicana, S.A.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	7.025	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	9.10	.....	.....	.....	.....
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.80	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

- Rolled elliptical, 18 in. or longer, 5000 lb lots 44.50
- Electrodeposited, 5000 lb lots 37.50
- OFHC anodes, 3 in. diam. (5000 lb) 42.50

Brass, 80-20, ball anodes, 2000 lb or more 51.50

Zinc, ball anodes, 2000 lb lots 18.25
(for elliptical add 1¢ per lb)

Nickel, 99 pct plus, rolled carbon, 5000 lb 1.05
(Rolled depolarized add 3¢ per lb)

Cadmium, 5000 lb 1.60

Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90

Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45

Nickel sulfate, 5000 lbs 31.00

Nickel chloride, freight allowed, 100 lb 47.50

Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums.... 25.80

Zinc cyanide, 100 lb, N. Y. 61.50

Potassium cyanide, 100 lb drum Chicago, del'd east of Rockies... 46.50

Chromic acid, flake type, 10,000 lb or more, N. Y. 30.94

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

- Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
- Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75
- Carbonyl Iron (200 lb lots) 88.00
- Welding Grades 8.10
- Cutting and Scarfing Grades 9.85
- Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades

- Electrolytic, domestic, f.o.b. shipping point. 15.06†
- Atomized ..... 44.3 to 62.3
- Reduced ..... 15.00†
- Chemically Precipitated 45.5

Brass, 5000-lb lots ..... 33.1 to 50.3

Bronze, 5000-lb lots ..... 51.5 to 56.8

Chromium, electrolytic 5.00

Lead ..... 7.50†

Manganese, electrolytic ... $1.00

Molybdenum .....$3.60 to $4.35

Nickel $1.15

Carbonyl Nickel, 20,000 lb lots $1.01

Nickel-Silver, 5000 lb lots.. 56.0 to 68.0

Silicon 70.00

Solder ..... 7.00†

Stainless Steel, 316 ..... $1.07

Stainless steel 304 ..... 89.00

Tin ..... 15.00†

Titanium, 99.25 + pct, per lb, f.o.b. $11.25

Tungsten, carbide grades... $3.25

Zinc ..... 19.5 to 32.7

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	39.75
	316	42.20	46.25	50.25	58.25
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, $43.85; 1 side, $36.60.

(Effective Nov. 13, 1961)

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
Super duty, Mo., Pa., Md., Ky....	$185.00
High duty (except Salina, Pa., add $5.00)	133.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk...	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00	
Childs, Hays	163.00
Chicago District	168.00
Western Utah	183.00
California	185.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O. 163.00-168.00	
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union, Pa.	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md. $620.00	
Gary, Ind.	658.50
Standard, Pascagoula, Miss.	647.50
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Baltimore	585.00

Magnesite Brick

Standard, Baltimore $715.00	
Chemically bonded, Baltimore	655.00
Chemically bonded, Pascagoula, Miss.	682.50

Grain Magnesite St. ⅝ to ½-in. grains *Per net ton*

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b., Pascagoula, Miss...	80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks 52.00-54.00	

Dead Burned Dolomite

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

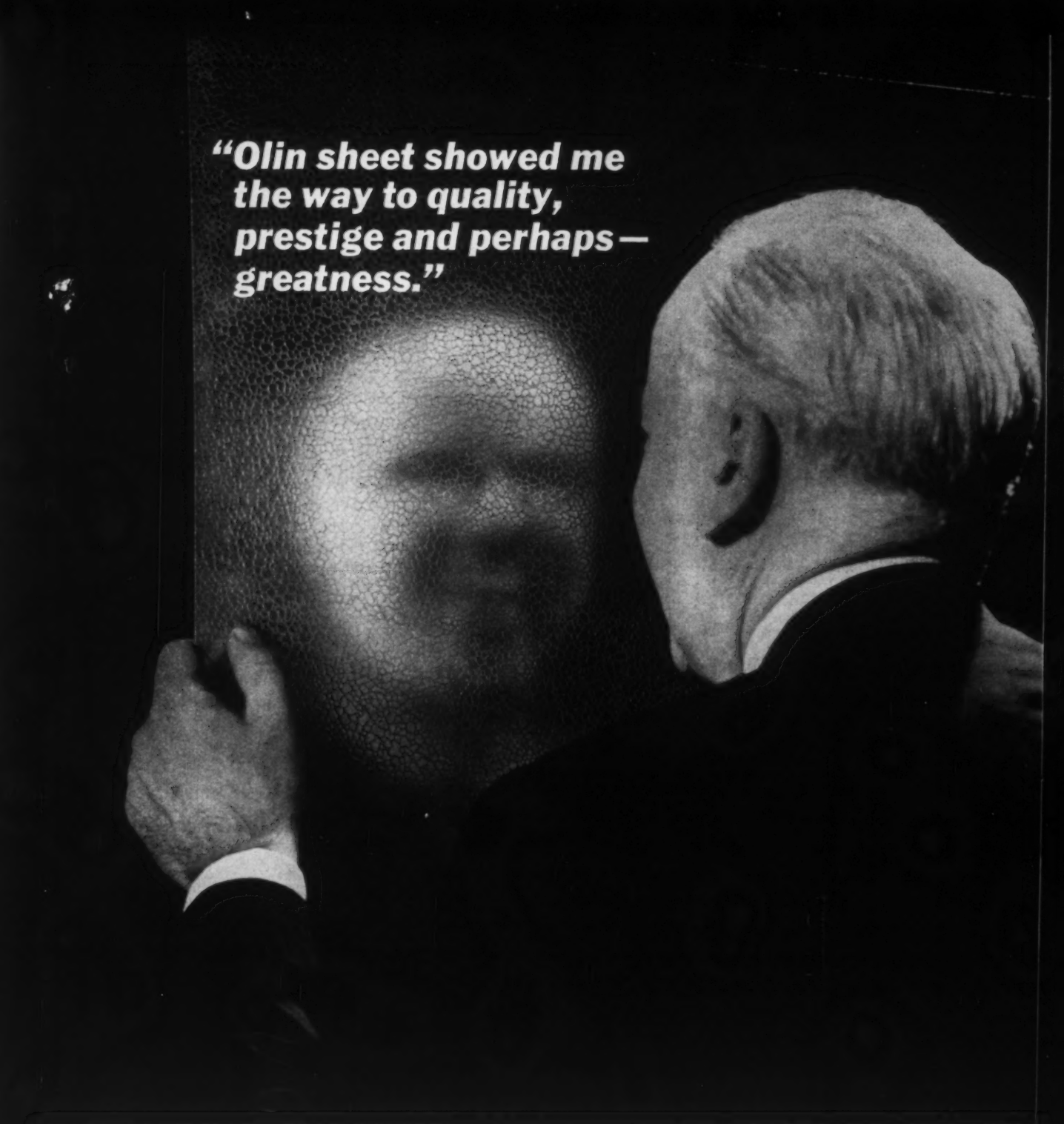
GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
Ohio Seamless Tube	3	12	62.62	73.40	55.59
Div., Copperweld Steel Co.*	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.



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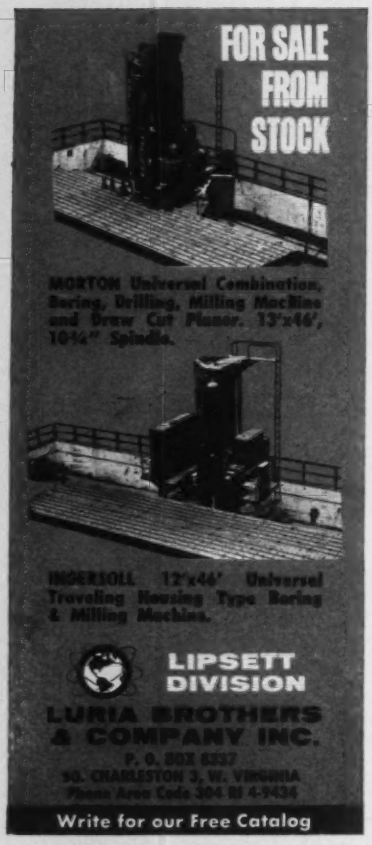
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12' x 10 ga Niagara Shear, new '40, hydraulic & air holddowns, cracked & welded—operating since, good condition $3,950.

12' x 12' x 35' Sellers Planer 4 hds, holding .001 to 1, rebilt, by G.E., '51; will give lifetime of service, ready to work $29,950.

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1950 G & L HYPRO PLANER MILLER 8' wide x 40" under rail x 30' table tvl, BELIEVED BRAND NEW NEVER USED (2) 60 HP swivel heads, high speed. Excellent. BARGAIN $49,950.

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4—1100 KW Allis Chalmers MERCURY ARC RECTIFIERS

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Primary: 33,000 V. 4160 V. 2300 V.
Secondary 275 to 86V. with 34 Variable Taps—Changed under load

4—1320 KVA 3 phase TRANSFORMERS
Primary 4160 V. Delta; Secondary 277 V. to Neutral with INTERPHASE REACTORS

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4400 KW 86 to 275V. or
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HEAT & POWER CO., INC.

60 E. 42 St., N.Y. 17 Murray Hill 7-5280

Pittsburgh Dealers See No Firm Upturn

Used machinery business continues its lag-and-spurt pattern in Pittsburgh.

Dealers see no signs yet of a firm improvement.

▪ Demand is still spotty in Pittsburgh. Used machinery dealers say there will be a few good days, and then another slowdown. There is no sign yet of sustained, decisive improvement.

The experience of one general machinery supplier is typical of conditions here. His business began picking up in late September. There was a lag at the end of October. The last few weeks have seen a little more activity.

Cheap Prices—According to this dealer, lathes, milling machines and other machine tools are attracting most interest. Customers are looking for "the latest equipment at cheap prices." Supply of late models is limited and owners are demanding fairly good prices.

At one recent sale, big boring mills brought prices ranging between $35,000 and $60,000. These figures make it clear there is still a market for good machines.

No Change—One general dealer sees absolutely no change in the picture. Heavy boring mills and lathes are drawing inquiries, but it is still hard to close deals. Many companies seem to be having trouble agreeing on purchases. One group will want to move; another faction wants to hold back. As a result, nothing happens.

One encouraging note comes from a dealer who handles both new and used equipment. The last few weeks saw increased interest in structural lines and other types of used machinery.

This development is attributed to a firming of prices for new equipment and to the fact that many companies are still pinched for dollars. The dealer says a number of manufacturers are passing the word that price increases are coming. However, it was also pointed out many types of equipment are still selling at the levels of 1958.

Steel Sales—Demand for electrical equipment has shown no change over the past 30 or 40 days. Steel mills, a big part of the local market, are still buying sluggishly. Prices are highly competitive.

The market for rolling mills is called moderately good. There is a ready demand for bar mills, when these can be found. However, there are not enough major capital programs to produce a really active equipment turnover.

This is a general complaint of dealers. Companies are buying on a spot basis to meet immediate needs. There is no general wave of expansion and planned spending.

Tax Factors—Two explanations are given for the lag:

Several dealers feel companies are holding back because of tax uncertainty. Once new incentives are nailed down, it is felt industry will be able to put plans on a firm basis. However, it is not expected the big push will come before next year.

The other big factor in the Pittsburgh lag is the failure of steel demand to move up more rapidly. The mills were disappointed by October business. With profits squeezed and no assurance yet of higher volume, they have been keeping a tight rein on all spending.

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No better values at any price

100 CFM	150 psi	6 x 7 Ing.
188 CFM	100 psi	7 x 7 Ing.—CPT—Worth
188 CFM	150 psi	7 x 7 Jay WG9.
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368 CFM	100 psi	12 x 10 Ing. Rand ERI
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528 CFM	100 psi	14 x 12 Ing. Rand ERI
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880 CFM	125 psi	18-11 x 10 Ch. Pn. V-CE 150 HP Syn. 3-00-440/2300 200 HP G.E. Syn. 3-00-4160
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2—10" Dia. x 10"/16" Face 2-HI Cold Mills with 40/65 H.P. Motors 230 volts DC. Edge Rollers, Coilers, etc.—complete.

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10 ton x 48'6" P&H 1942 AC
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10 ton x 75'0" Northern 1925 AC
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20 ton 28'10" Shaw-Box DC 1946 DC
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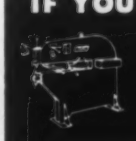

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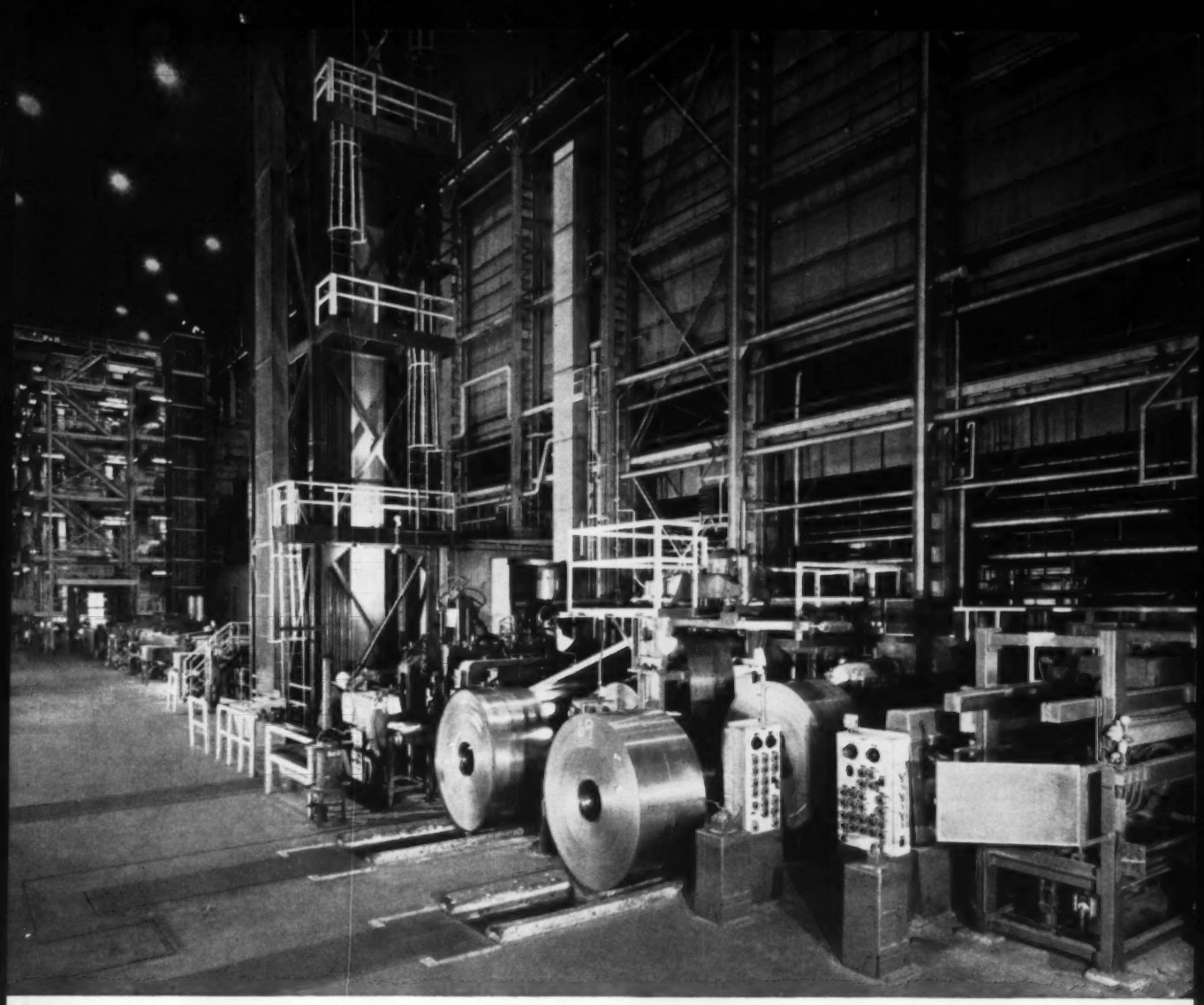

New Wean Continuous Annealing Line increases Inland's tin plate capacity

Recently installed at Inland Steel Company's Indiana Harbor Plant, this new Wean continuous annealing line was added in an expansion of the company's high quality tin plate production. Designed to operate at speeds up to 1250 fpm, the No. 2 line can handle 48,000 lb. coils, with a maximum O. D. of 73" and a maximum strip width of 44".

Heavy-end reject material is welded and recoiled on a scrap reel at the entry end. Constant preset tension and accurate tracking of the strip are maintained throughout the line by five precision bridles. A TV monitor checks strip tracking within the furnace section.

Whether your planning includes modernization of existing processing facilities or installation of new equipment, Wean will be able to assist you. Wean's 32-year partnership with the steel industry has resulted in unparalleled experience in the design and construction of strip and sheet processing facilities. Wean's "Creative Engineering" is ready to work for you.

WEAN

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SLABS, BLOOMS AND ROUNDS ON THIS VERSATILE MILL

Quick handling of ingots another dividend

"Big investment, big dividends" sums up the new automated blooming mill illustrated above. Key component of a new $14 million steel plant, it was built and designed by Bliss' Rolling Mill Division to enable its owner, a prominent manufacturer of heavy equipment, to meet mounting orders for seamless tubing and welding fittings.

Here is automation at its smoothest. With only a handful of men in efficient control pulpits, the plant can turn out blooms of many shapes and sizes.

Heart of the operation is a new, 40" x 90" high-lift blooming mill, whose rolls are automatically set for each pass by punched cards. Taking the ingots poured by the new 100-ton electric furnace, it rolls them into the size required.

Of special interest is the mill's unusually versatile design. Thanks to it, the plant is able to handle round shapes as well as blooms and slabs, simply by changing the rolls. The latter were supplied by Bliss' Mackintosh-Hemphill Division.

According to the plant superintendent, this new plant has increased the company's melting and rolling capacity a full 50%. And based on its proven operating performance, the new Bliss mill will be ready to take any additional new load in stride.

Whether your plans call for a big outlay or a modest one, it will pay you to discuss them with Bliss. To learn how other firms have . . . and have profited . . . write for our 84-page Rolling Mill Brochure, Bulletin 40-B.

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